

# AGRICULTURAL CHEMICALS



*Cover photo: Speakers at Del-Mar-Va Fertilizer Conference (see page five for identification)*

*In This Issue:*

Congressman Delaney Shows His Hand (editorial) • Secretary Brannan Lauds Plant Food Industry  
Dormant Sprays for Brush Control • Pacific Slope AAEE Meets • Northwest Fertilizer Group Meets  
Statutory Control of Pesticides • NACA to hold September Meeting • Corn as Potential User of Fertilizer

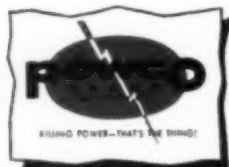


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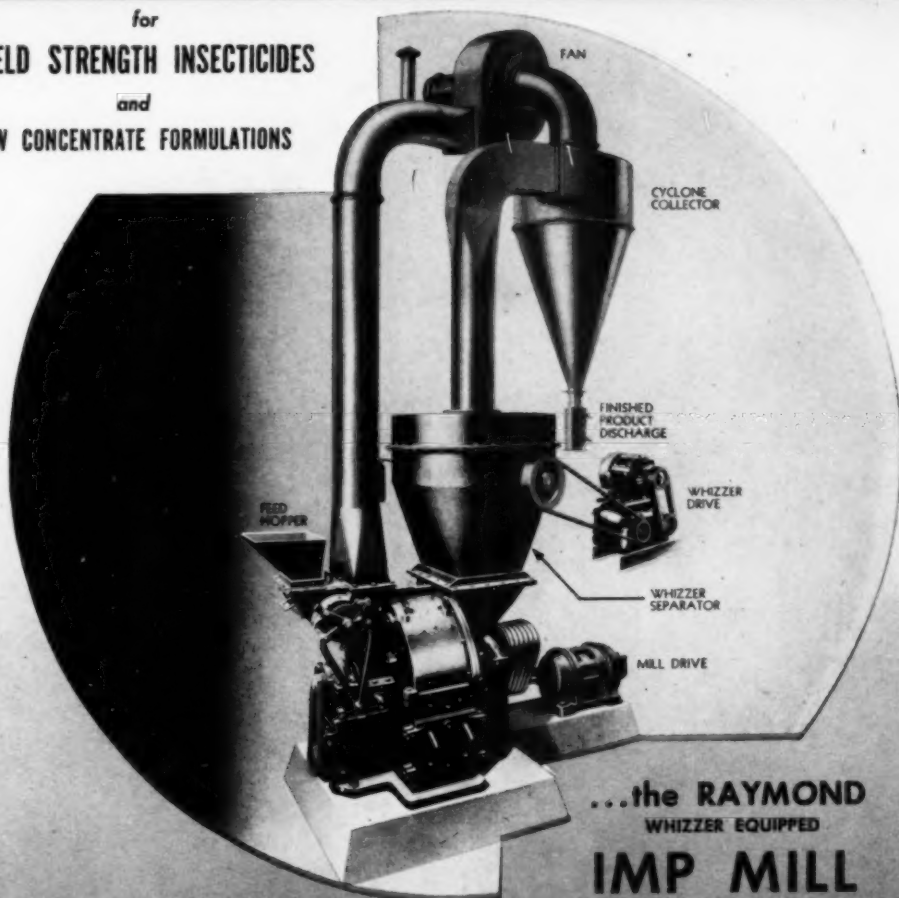
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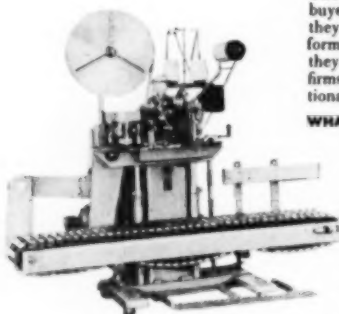
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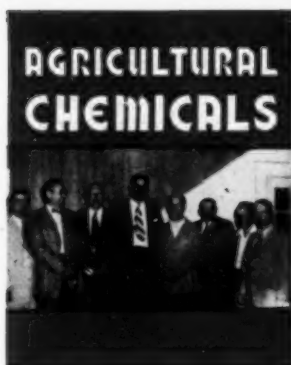
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**THIS MONTH'S COVER:**

Speakers at the recent Del-Mar-Va Peninsula Fertilizer Association meeting at Ocean City, Md. Left to Right: Borden S. Chronister, Barrett Div., Allied Chemical & Dye Corp.; Louis H. Wilson, American Plant Food Council; Fred S. Lodge, National Fertilizer Association; Governor Elbert N. Carvel of Delaware, president of the Association; U. S. Senator Herbert B. O'Connor, former Governor of Maryland; Sen. J. Otis McAllister, Dorchester County, Md.; Edgar H. McGrath and Ralph A. Ross, secretary and vice-president, respectively, of the Association. (Other picture on Page 71).

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AUGUST

No. 8

1951

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CHEMICAL CORPORATION OF COLO.  
12th and Quivas Denver, Colorado  
Phone ACama 5895

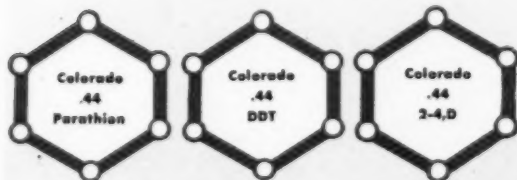
LIQUID COTTON SPRAYS AND DUSTS AVAILABLE

AGRICULTURAL CHEMICALS

# Late season Insecticide Profits

The insecticide business is more than an early spring and summer business to aggressive dealers. Many dealers sell as much late in the season as they do earlier. Now is a good time to learn about finer Colorado .44 formulations of America's most effective insecticides. Get your late-season stocks from Colorado .44! A phone call, a wire or a letter will bring you complete information and prices.

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**rodenticide for control**

**of rats and mice, is available in bulk for repackaging, or for**

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The widely advertised slogan of a great manufacturer of pharmaceutical products proclaims that the priceless ingredient of a product is the reputation of the maker.

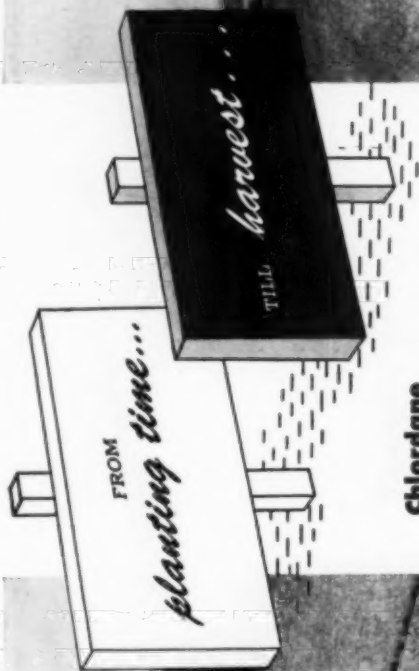
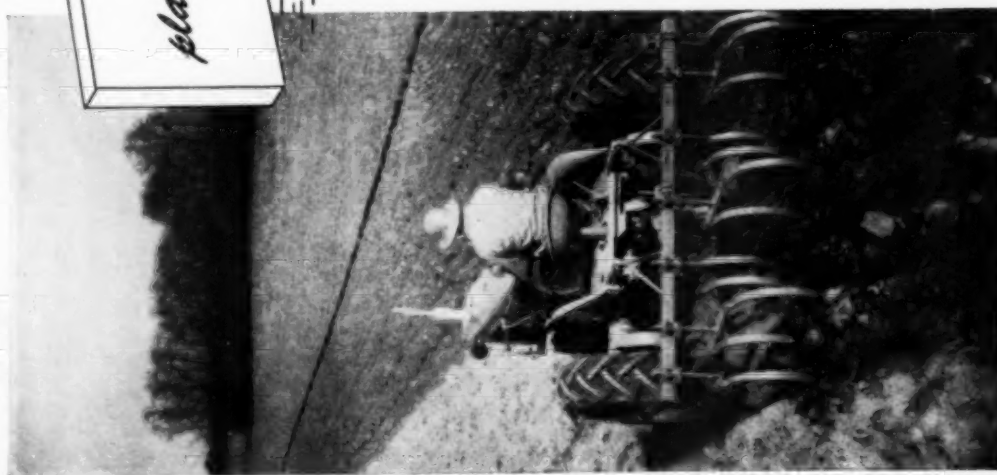
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P.C.A. still leads the industry in the production of 60% MURIATE.

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**potato harvest date with**

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Investigate Penite sodium arsenite, both as a potato top killer and for other uses. Remember, technical assistance is always available. Write or call: Agricultural Chemicals Department, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa. • Tacoma, Wash. • Bryan, Tex. • Montgomery, Ala. • Portland, Ore. • Los Angeles and Berkeley, Calif.

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Weed Killer and Soil Sterilizer  
Termite and Ant Control Formulations

**Principal Pennsalt basic agricultural chemicals:**

BHC	DDT
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SODIUM ARSENITE	CALCIUM ARSENATE
SODIUM CHLORATE	

\*Read labels thoroughly before using any arsenic-bearing compound.

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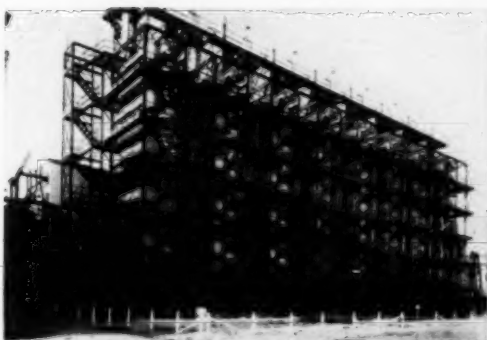
**PROGRESSIVE CHEMISTRY FOR OVER A CENTURY**



**Mills Money-Maker** is a well known brand of fertilizer with farmers of Southeastern Georgia. Their loyal purchases of 3-M Brand made possible this modern fertilizer plant built at Sylvania in 1949.

Efficiently operated by J. P. Evans, David W. Reed and H. A. Williams, Jr., this plant has a daily capacity of 300 tons. And like so many leading fertilizer mixers, Mills Money-Maker uses Spensol.

## Mills Money-Maker **3M** ... Another Spensol User



Spensol (Spencer Nitrogen Solutions) is produced in large quantities at plants in Pittsburg, Kansas, and Charlestown, Indiana. More mixers every year are using Spensol because of its reputation for producing low-cost, well-conditioned fertilizers.



Feel free to call on Spencer's Technical Services Department — whether you use Spensol or not. Spencer's team of technical men will be happy to visit your plant and help you step up production while you improve your quality.

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Pittsburgh

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*Controls nearly **ALL** principal insects  
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AGRICULTURAL CHEMICALS



## SEVEN SOLUTIONS TO THE *Sulfur Shortage*

Since sulfuric acid is vital to almost every industry, the current shortage of elemental sulfur, from which this acid is generally derived, is a serious matter and has a worldwide effect. Waste materials that can be converted into sulfuric acid and unworked sulfur bearing ores hold the

answer to the sulfur shortage. Chemico offers proven processes for utilizing such sources of sulfur. If you have a source, in commercial quantities, of any of the following materials, please give us details. We will then be glad to make specific recommendations without obligation.

### WASTE MATERIALS

1. **Spent Alkylation Acid**, a refinery by-product in the manufacture of high octane gasoline, can be regenerated into fresh sulfuric acid of any desired strength.
2. **Oil Refinery Sludge** is another refinery by-product resulting from the treatment of petroleum fractions. The acid content is recovered as fresh acid of high strength.

3. **Waste Iron Sulfate-Acid Solutions** are by-products from steel mills and titanium pigment manufacturing plants. The sulfuric acid is concentrated for re-use and the iron sulfate converted to fresh sulfuric acid.

4. **Smelter Gas** results from metallurgical operations where sulfide ores are roasted preliminary to the recovery of metals. The gas is cleaned and processed into fresh sulfuric acid.

5. **Coke Oven, Natural and Refinery Gases** contain sulfur as hydrogen sulfide. This may be reduced to sulfur or extracted directly as a raw material for producing sulfuric acid.

### SULFUR BEARING ORES

6. **Pyrites** and other metal sulfides are roasted to produce sulfur dioxide gas which is then converted into sulfuric acid.

7. **Low-grade Surface Deposits** containing sulfur in elemental form are treated by a new and economically sound process which recovers the high quality sulfur necessary for modern contact plant operation.

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*Benzene Hexachloride is the lethal chemical in most of the dust and spray insecticides which today are destroying these pests and saving cotton for the big defense job.*

*Whether you have weevil trouble or not, there are many ways in which your own daily life is made safer and more comfortable with chemicals from Tennessee . . . and industry serving all industry.*

**AGRICULTURAL CHEMICALS**





## **LION provides one-stop nitrogen service to Southern fertilizer manufacturers**

**Lion Anhydrous Ammonia** — Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

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**Lion Nitrogen Fertilizer Solutions** — Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

**Lion Ammonium Nitrate Fertilizer** — The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

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*Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking . . . just write.*

## **LION OIL COMPANY**

**Chemical Division • El Dorado, Arkansas**

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**BASIC AGRICULTURAL  
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QUALITY**

**DDT**

100% technical  
Wettable Powders  
Dust Concentrates  
Emulsifiable Solutions

**BHC**

Technical grade (36% gamma)  
12% gamma Concentrates

**2,4-D**

Acid  
Sodium Salt  
Butyl Ester  
Isopropyl Ester  
Ester and Amine salt solutions  
Low-volatile Esters

**2,4,5-T**

Isopropyl and Butyl Esters  
Low-volatile Esters

Plants in Newark, N. J.  
and Houston, Texas

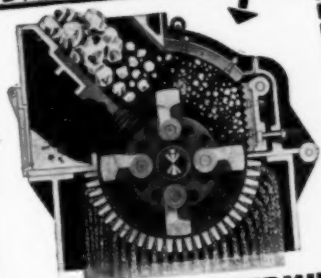
**K**

**Kolker Chemical Works Inc.**

30 LISTER AVENUE, NEWARK 5, N. J.

*Manufacturers of Agricultural Chemicals*

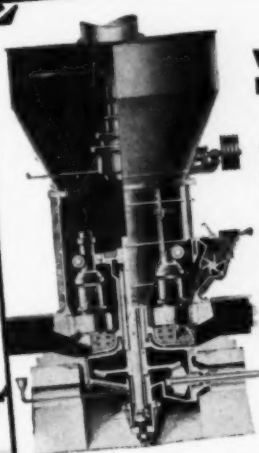
DDT ... GYPSUM ... TOXAPHENE ...  
 2, 4-D ... ROCK PHOSPHATE ... LIMESTONE ...  
 BHC ... PYRETHRUM ... SABADILLA ...  
 ROTENONE ...



### WILLIAMS HAMMERMILLS

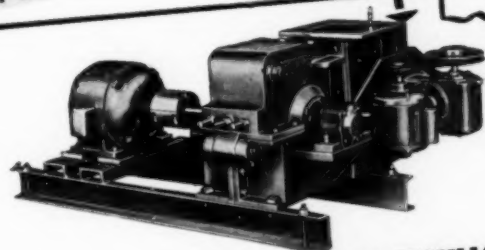
Heavy duty for crushing and grinding rock phosphate, gypsum, limestone and similar materials.

Also for disintegrating ammonium sulphate lumps and fertilizer mixes that "set-up" in storage.



### WILLIAMS ROLLER MILLS WITH AIR SEPARATION

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### W.T./M.G.P.\*

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Submit your grinding problems to Williams. A sample of the material and description of the desired result will set our facilities to work on a solution to your problem. Visits during test runs and technical consultations are invited.

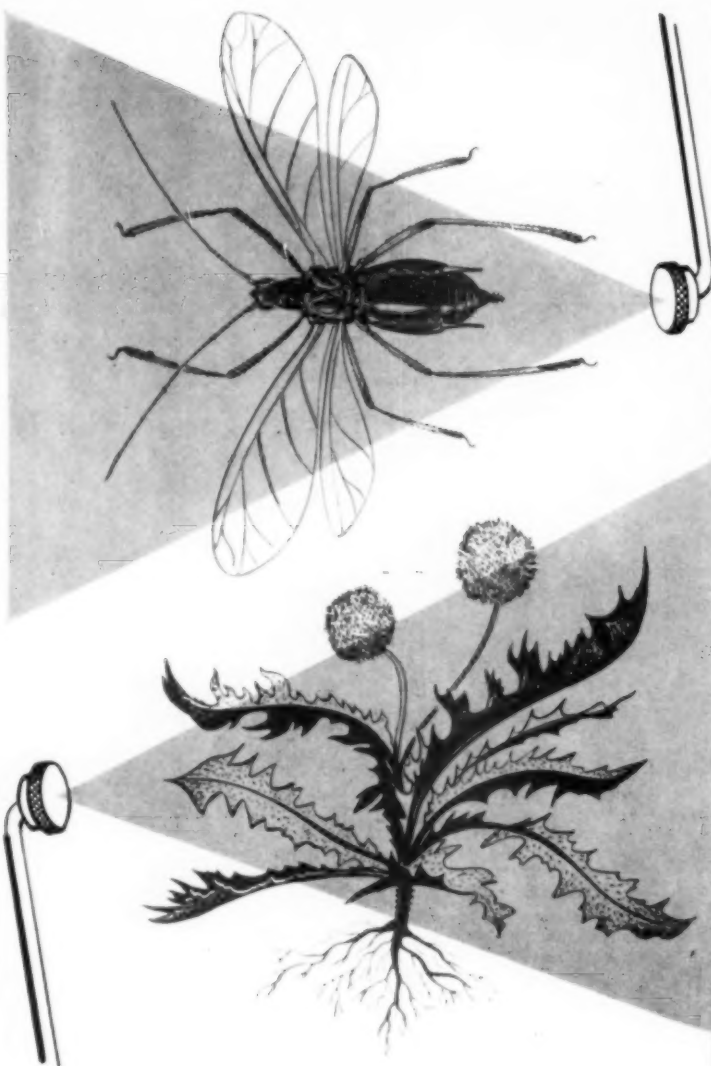
**WILLIAMS PATENT CRUSHER & PULVERIZER CO.**

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# WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMERMILLS IN THE WORLD



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In this period of scarcities and uncertainties, it is good business to establish

a line of supply well in advance of delivery to protect your business and to make sure you get your share of available materials.

Check now with your nearest Monsanto Sales Office regarding (1) availability of insecticidal and herbicidal chemicals and (2) for technical assistance in formulating. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 S. Second St., St. Louis 4, Missouri.

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**SANTOBANE® (DDT)**

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**TRICHLOROBENZENE,**  
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**NIRAN®**  
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**2,4-D SODIUM SALT**

**2,4-D ISOPROPYL ESTER**

**2,4,5-T ACID**

**2,4,5-T ISOPROPYL ESTER**

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Tech.)

**SANTOPHEN 20**  
(Pentachlorophenol, Tech.  
Penta Weed Killer)

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\*Reg. U. S. Pat. Off.



**AGRICULTURAL CHEMICALS**



# FOUR FAMOUS PHILLIPS FERTILIZERS!

## 1 AMMONIUM SULFATE

Phillips 66 Ammonium Sulfate is a free-flowing 21% nitrogen material! Mixes easily! Uniform crystals resist caking! Ideal for high analysis mixed goods! A fine direct application material, too!

## 2 AMMONIUM NITRATE

Phillips 66 Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for uniform, free-flowing properties and top-notch crop response.

## 3 NITROGEN SOLUTIONS

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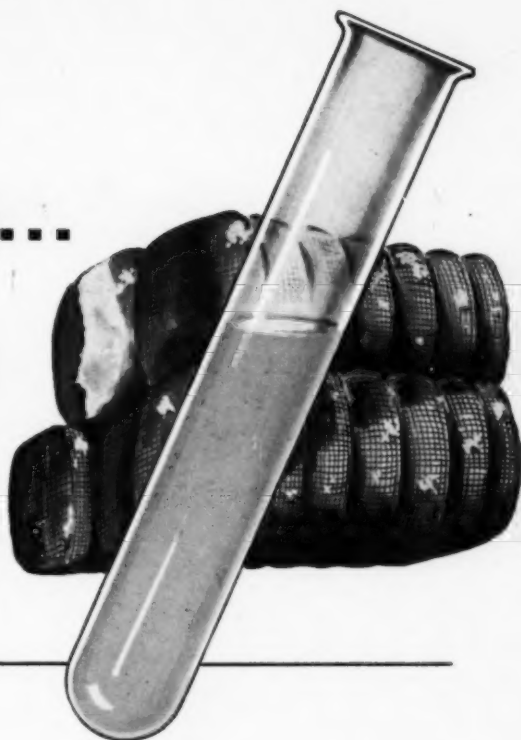


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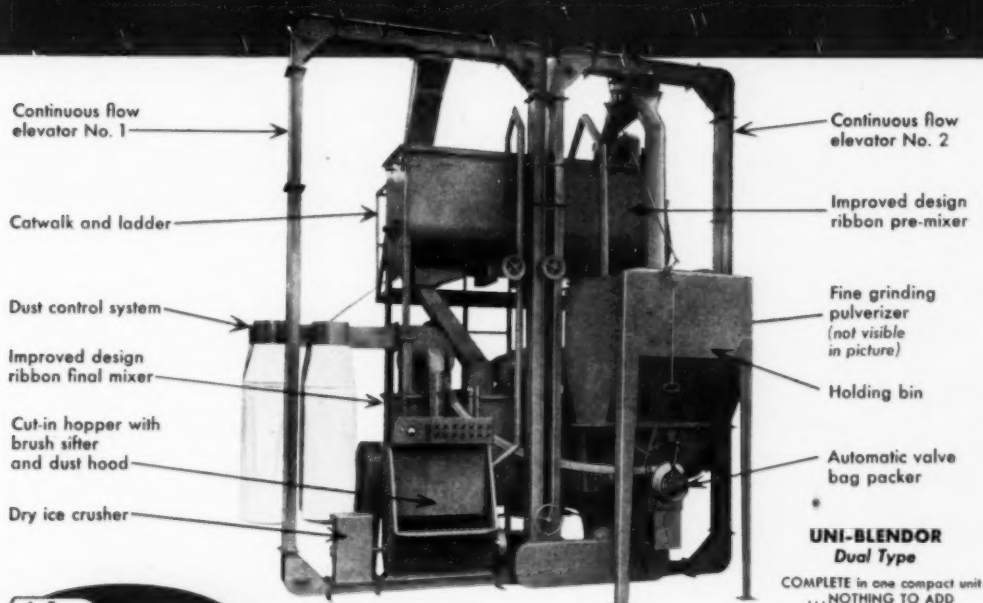
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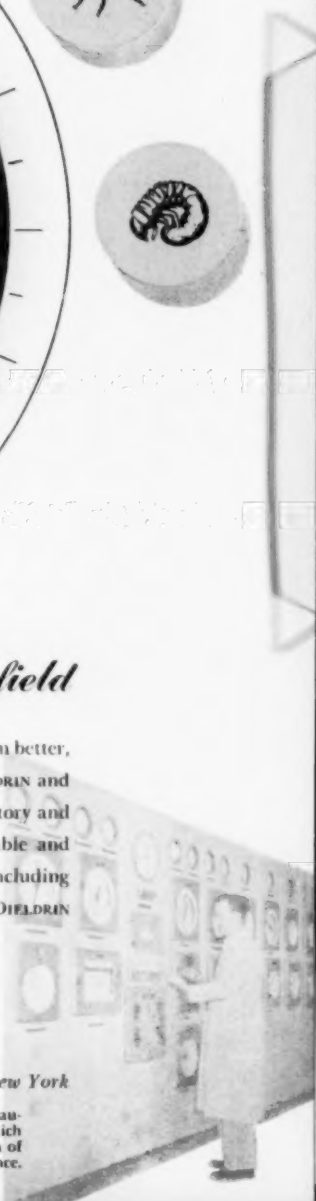


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## THE EDITOR COMMENTS

**T**HE American potash industry has built up a remarkable production record since the strikes in the mines were settled a little over a year ago.

According to figures just released by the American Potash Institute, deliveries in North America reached a record total of 1,712,281 tons in the year ended May, 1951. This exceeds by 46% the total for the previous record year, 1948-49.

Can the country absorb this heavy production increase on a continuing basis? Apparently it can, for in addition to taking this record domestic production, it is probable that imports of potash from abroad also set new records in the 1950-51 year. Incidentally, agricultural demand for potash showed a bigger gain than did the capacity of the domestic industry to produce. Deliveries for agricultural purposes in the continental U. S. amounted to 1,495,057 tons K<sub>2</sub>O in 1950-51, a 57% increase over the previous year.

Once again the free private enterprise system has demonstrated that it can smash production records at will, when allowed to operate.

**A**NOTHER domestic industry has also been doing a remarkable job in producing a raw material which is essential to both fertilizer and insecticide manufacturers. We refer, of course, to the sulphur producers. They have, so far this year, been maintaining, even exceeding the record production pace of 1950. In the first half of 1951, production reached approximately 2,690,000 long tons, compared with 5,342,000 tons in the full year, 1950.

Soaring demand, however, both here and abroad, makes it seem certain that the shortage will continue for a period of at least two years. World production will increase in time. Indeed, every day word comes of some new sulphur source being tapped somewhere around the world. It must be kept in mind, however, that such added production will be at a higher cost

than American brimstone. And in a spirit of enlightened self interest, we recommend very strongly that the sulfur demand of the rest of the world be allowed to be filled from these new sources, while our domestic low-cost sulphur is reserved for American users.

**I**NDUSTRY advisory committees are blossoming in Washington like kids around the free ice cream stand at a Sunday school picnic. With 3 new insecticide committees formed during the past month, and 6 representing various branches of the fertilizer industry, the parade to Washington grows in volume as Washington hotel keepers grin with glee. They haven't had it so good since the days of NRA, WPB and NRA, nor have the Washington cab drivers, waiters and bell hops.

And as the parade to Washington grows, we note with concern that government seems to be making some of the same old mistakes it made the last time industry advisory committees were called upon to lend their aid in solving difficult supply and pricing problems. For one thing, there are probably too many committees. Why there should be separate committees for so many separate sections of one industry is a little beyond us. Why not one committee, with separate and small sub-groups to handle special divisional problems,—“task groups” the Washington boys used to love to call them during World War II? And why one set of committees for NPA and another for OPS?

Finally, why a repetition of what we thought were two colossal “bulls” of the previous Industry Advisory Committee days,—the exclusion of trade association and trade press representatives from any participation in committee functioning? Ordinarily trade association and trade press representatives are among the best informed people in the industry. They might even be able to add something worth while to the deliberations of these committees. And what do they discuss at these meetings anyhow that is

so secret it can't be allowed to get out? Nothing, in fact but industry problems that are the proper concern of all trade associations and the press. Nothing but matters of legitimate trade interest

which eventually will have to reach ninety percent of the people in the industry through the very medium of the trade associations and the press!

## Politics, or Ignorance?

**E**VEN before the Delaney Committee, investigating the use of chemicals in and on foodstuffs, has completed its study of the subject, the chairman of the committee, Congressman James J. Delaney, seems to have made up his own mind that new legislation is needed, and has taken this case to the people in an article, "Peril on Your Food Shelf" in the July issue of *American Magazine*. We question the propriety of this course, as it obviously would seem more fair-minded in a quasi-judicial proceeding of this type for the chairman of the committee to keep his mind open at least until the final witness has been heard, and not parade himself so obviously before the public as having made up his own mind on the correct answer before the hearings have even been concluded.

But Congressman Delaney lays himself even wider open to attack, we feel, for his apparent willing acceptance of some of the more questionable points of testimony that have been offered in evidence in the hearings to date. Pointing to the growing number of mental diseases in the U.S., he observes that this makes one wonder "if there is not some connection between that problem and the many new chemicals used in our foods." Continuing, he observes, "there may be some connection between these new chemicals and the increase of such diseases as cancer, polio and the mysterious virus X."

Going back to the imposing record of the hearings themselves, the most prom-

inent witnesses we recall who offered testimony of this type included J. I. Rodale, organic gardening advocate; Louis Bromfield, writer and lecturer and operator of Malabar Farm, and Dr. M. S. Biskind, whose chief claim to insecticidal fame is sponsorship of a sensational series of articles for a New York tabloid last year.

Mr. Rodale, it developed before the committee, has no technical training and was an accountant and a manufacturer of electrical products before taking up the cudgels for organic gardening. Nor does Louis Bromfield have chemical or insecticide background, being primarily an author and lecturer. Why they were even called in what is presumably a search for authentic scientific findings, is rather difficult to understand. Dr. Biskind seems to be the only doctor who has discovered any connection between insecticides and polio, virus X, etc. His testimony was directly and convincingly countered before the Delaney committee by Drs. Paul Neal and W. T. Hayes, Jr., of the U. S. Public Health Service, who said "there are at present no authentic cases of chronic DDT poisoning of human beings in the literature where careful scientific data accompany the report."

Congressman Delaney, in apparently choosing to credit the testimony of these three witnesses, setting aside the vast weight of the contradictory testimony offered by other and far better qualified witnesses, has, we feel, proved himself to be either an extremely gullible

(Turn to Page 87)

# Fertilizer Production a MUST for Peaceful World

by

**Hon. C. F. Brannan\***

Secretary of Agriculture

**T**HE dramatic, world-shaking events of the last year have ushered American agriculture into a new phase of development—a period of profound importance to the success of the nation's defense effort. It is a period that will find the plant food industry playing its greatest role in history.

The threatening international situation and our mobilization program have created a new and sudden demand for greatly increased quantities of agricultural commodities. But this new demand comes at a time when American agriculture already is producing at a very high level. It has come at a time when American agriculture is maintaining in production just about every acre of the farm lands now available to crop production.

This situation means that American agriculture cannot look to new land and expanded farm acreages to satisfy the nation's immediate growing needs for food and fiber. It means that agriculture must concentrate largely on making existing acreages produce more abundantly.

It follows then that we must work harder than ever for wider adaptation of better farming practices and techniques. And it is in this connection that we must depend as never before on the output of the plant food industry. For the application of increased quantities of fertilizer is the farming practice which provides one of the biggest opportunities for increasing quickly all

agricultural production in behalf of the defense effort.

We have, in effect, just crossed the threshold of a "fertilizer era" in American agriculture. It is an era that brings with it a number of special problems. Foremost among them is the problem of achieving increased production of fertilizer to meet agriculture's pressing needs. I want to take this opportunity to report to you, as fully as I can at this time, the thinking and actions of the Department of Agriculture with respect to that problem.

I am glad that leaders in the plant food business are devoting a great deal of thought to agriculture and its role in the mobilization program. I know that sincere pride is taken in the fact that the industry's product and the efforts of its people contribute materially to the nation's food supply and will help to develop a permanent and profitable American agriculture.

First, here is a brief general picture of the challenge facing agriculture in filling its role in the mobilization program. Then a look at what the Department of Agriculture is doing, in a general way, to help agriculture fill that role.

Agriculture faces the challenge of producing enough to supply the nation's expanding military forces with food and the growing defense industries with raw materials. It must produce enough to supply the 130 million people who make up

the nation's civilian population, and enough more to carry at the same time a safe margin in strategic reserves.

On top of all this agriculture must produce enough to back up the nation's foreign policy by continuing to share our abundance to the fullest possible extent under sound arrangements with friendly allied countries in need of help.

The 1951 production guides for agriculture call for the greatest total volume in history—43% more than the 1935-39 average—4% more than last year. The biggest increases are needed in cotton, corn, wheat and rice with substantial increases also in truck crops.

The production guides place the heaviest emphasis on feed crops, especially corn. And they urge all possible improvement of yields in grass and hay crops in order to meet the increasing demands for livestock products.

Agriculture must meet this challenge in the face of limited land resources and limited labor resources. The basic problem, of course, is that of getting greater output per unit of land and labor resources.

## USDA'S Policies

**L**ET me review the policies the Department of Agriculture is following to achieve this end:

First, we are helping farmers organize their efforts according to a carefully balanced production pattern which makes the most effective use of our agricultural resources and is

\*Before American Plant Food Council, Hot Springs, Va., June 16, 1951.

closely geared to civilian and military requirements.

Second, we are working for more widespread adoption of better farming practices which increase production.

Third, we are insisting as forcefully as possible that adequate machinery, fertilizers, and insecticides—the farmers' tools of production—be kept available.

Fourth, we are working to help agriculture retain sufficient skilled manpower on its farms.

And fifth, we are working to provide reasonable price assurances to agriculture so that farmers can go ahead with the business of expanding production with some assurance that their markets later will not come crashing down about them. These are the policies which guide the Department's overall program at the present time.

Fertilizer, of course, is one of the most vital factors for success of this program. It is the one tool of production—if I may call it that—on which we can depend for increasing production of all kinds of crops on most soils.

#### How Much Fertilizer?

**T**HE Department has made an appraisal of the situation to determine just how much of an increase in fertilizer production we will need to fill the nation's agricultural requirements. This has been made not only on the basis of what we hope will be the short-term needs of the present emergency period but also on the basis of long-range expectations for normal growth in the use of fertilizer.

It is a very interesting appraisal. It reveals, of course, that in view of the increased demand for agricultural commodities, a serious shortage of fertilizer is developing. This shortage is best illustrated in terms of the meat situation.

As you know, meat is one of the most sensitive commodities in the food picture today. It is generally agreed that civilian morale and the success of anti-inflation measures rest heavily on the ability of our ran-

chers, farmers, and feeders to increase meat production. But there are difficulties in this situation which tie in very closely with the business of manufacturing and distributing fertilizer.

Livestock production already has grown to the point where it has outdistanced the nation's current rate of feed production. As a result, the nation is digging into its feed reserves to maintain present meat production, while people are clamoring for an even greater meat supply.

Consumption of meat this year is expected to be about 146 to 147 pounds per capita. But it would be several pounds less than that if it had to depend on this year's expected feed production.

It appears as if we will have to draw upon our grain reserves again next year if we are to maintain the current rate of meat consumption. This could be prevented only if feed crops this year turn out to be larger than those indicated by farmers' planting intentions on March 1.

Thus we find meat production and the demand for meat climbing upward, with feed production already behind, with our feed reserves being reduced, and with few additional acres immediately available for increasing feed production.

At average yields we would need several million acres more land to balance feed production against the demand for meat. Needless to say, there is no hope of solving the problem immediately in that way.

#### Fertilizer the Answer

**I**T is a relief to be able to turn to a promising alternative—the alternative of fertilizer. We know that one ton of nitrogen fertilizer used in combination with other improved practices gives an average increase in crop yields equal to the production of eight to 15 additional acres of good farm land. And we know that we are not using nearly as much nitrogen as could be applied to increase crop yields. We believe that if agriculture is going to meet the emergency needs of the

defense program, it will require an additional 500 thousand tons of nitrogen fertilizer.

Of course, we know that nitrogen must be balanced with phosphates and potash. But we know that the greatest potential for increased crop production lies in fertilizer practices which lean more heavily on nitrogen.

Whereas the average fertilizer ratio in the past has been of the 1-3-1 type—one part nitrogen, three parts phosphorus, and one part potash—ratios now are moving in the direction of equal parts of all three ingredients. Our soils experts tell us, however, that for the best utilization of fertilizer materials and the biggest return from their application, we should in many areas be using a 2-1-1 ratio—that is, two parts of nitrogen for each part of the other components.

We know that we can increase nitrogen production without great difficulty. Nitrogen resources in the atmosphere are virtually limitless. All we need is greater production capacity.

#### Phosphates Tight

**A**LTHOUGH phosphates are in tight supply, we know that we can make more effective and economical use of present production. The phosphate situation, as you know, hinges at present on the availability of sulfuric acid to break down the phosphate rock. For this reason we are starting a sulfur-phosphate conservation program. The plan is to draft a program of suggestions and recommendations on how to stretch our limited sulfur and phosphate supplies. It will involve a survey of present uses and an examination of possible substitute materials as well as recommendations on how to use the supplies we have to the best advantage.

There is a great need for increased use of phosphates and potash on many of our soils, especially those devoted to hay and pasture crops. Farmers often devote their poorest land to those crops, with the result that the nation's grasslands, of all

**Secretary Brannan says Government willing to help in bolstering fertilizer supplies but states that private industry must "carry the ball." . . . Points out tremendous increase in per acre yields over past decade, credits use of fertilizer for much of this gain. Fertilizer called key for greater production and improving soils for the future.**

our croplands, present the greatest potential for increasing production and improving soil resources.

Proper fertilization of our grasslands not only brings greatly increased yields of forage crops, but enriches the nutritive value of the crops as well. This is another way in which fertilizer contributes toward building a more adequate meat supply for the nation.

Thus we find that while little additional cropland is available to satisfy the nation's emergency food and fiber needs, the desired result can be obtained through increased production and use of fertilizer—especially nitrogen.

This situation—this dependence of American agriculture on increased supplies of fertilizer—comes as a surprise to most people and even to most farmers. A quick look at what has happened during the past 20 years, however, will help to clear up the picture.

Although the total acreage of cropland has not increased significantly during the past 30 years, farmers found several ways of increasing production to keep pace with our growing population. Mainly this was done through mechanization, improved crop varieties, better pest control, fertilization and improved cultural practices.

For example, agriculture substituted tractors for 20 million of the 26 million horses and mules on farms. This increased production efficiency and released about 63 million acres of land for the support of additional meat and milk animals. Changing to hybrid corn increased yields about 20 percent, and this change has been made on 70 million of the 85 million acres on which we grow corn in this country. Increasing soybean production from four million to 287 million bushels, provided a much better balanced diet for livestock.

Farmers more than tripled the use of fertilizer in this 30-year period and introduced other improved practices.

These improvements still have unexpended power for further expanding production. But the present trend of increase is not enough to meet urgent emergency needs. We must speed up our rate of increase. Therefore we are looking on fertilizers as the key for accelerating production and improving soils for sustained production at high levels.

Of course, meat and feed grains are not the only big production problem facing agriculture. Let's take a look at the situation in the growing of cotton, a very important basic commodity used in produc-

ing implements for defense. It is used in smokeless powder, plastics, films, parachutes, and balloons, as well as in clothing soldiers.

A year ago we had one-third of a good year's cotton crop in reserve. But we now have used up the entire reserve and are trying earnestly to increase production. We are doing this by increasing cotton acreage and taking acres away from other crops. This is one of the factors in our short supply of feed grains.

Actually, it would seem as if there were no limit to the amount of additional fertilizer we could use in easing our agricultural problems. This is especially true when you consider that it might become necessary for our munitions plants to step in and take a large share of production, leaving agriculture in a worse position than before.

However, we know there are practical limits as to the amount of increase in fertilizer production we can expect in the next year or two. For one thing, it takes steel to construct fertilizer plants and steel also is a critical defense material.

Taking all factors into consideration, we in the Department have settled on a "minimum, essential program" involving fertilizer which we believe will have the support of the plant food industry.

#### **N Output Expanded**

**F**IRST, we are working to assist private industry to increase nitrogen fertilizer production by 500 thousand tons. Present production is about one million, 250 thousand tons a year. The increase, amounting to 40 percent, would raise the total to one million, 750 thousand tons.

Such an increase in nitrogen fertilizer production, we believe, would enable American agriculture to satisfy current demands for food and fiber without drawing on necessary reserves. The increase is particularly important in view of the fact that any step-up in the production of munitions would take nitrogen away from agriculture.

We believe that this method  
(Turn to page 63)



# Dormant Season Chemical Brush Control

By L. L. Coulter\*

Dow Chemical Co.  
Midland, Mich.

RESEARCH workers of The Dow Chemical Co. (2) presented data in 1947 indicating the possibility of controlling brush during the dormant period. This new development has actually been field tested since 1948, (4) and dormant brush control has now become an established reality. While this method does not promise to replace foliage treatment as a general brush control measure, it does offer several features which promise to make it one more valuable tool in controlling stands of woody plants such as those found in rights-of-way, fence rows, pastures, and range land. (6) Dormant brush

control provides a safer method of controlling brush in areas where the possibility of drift to adjacent sensitive crops make spraying hazardous during the growing season. It provides an opportunity for the use of trained crews and equipment which would otherwise be employed only during the growing season. This extension of the spraying season allows organizations with acute brush problems to bring more land under control in any one year.

While scientists concerned with the earlier development of this program have been conservative in their evaluation of results, at least

one major utility company has been killing brush on a field scale during the last two winters. With the experience gained from intensive research and field testing it is now possible to draw some reasonable conclusions and present the dormant brush control story as it now looks.

## Oil Carriers Best

IN contrast to foliage sprays where a considerable portion of the chemical enters the plant through the leaves, dormant sprays must enter primarily through the stem. Research has shown that water alone is relatively ineffective as a carrier for these chemicals during the dormant season. It has been further demonstrated (3) that fuel oil, kerosene or similar oils are the most effective of the commonly available oils for spraying purposes. However, some other oils show promise and the search is continuing for more effective carriers and for additives which may increase effectiveness. Some emulsions "fortified" with ten to twenty gallons of oil in 100 gallons of spray have given encouraging though erratic results. These emulsions, if they should prove to be effective, would reduce the cost of the spray mixture by eliminating as much as 80 to 90 per cent of the oil and would also serve to solve some of the problems involved in obtaining oil supplies. On the other hand, working with emulsions can be an inconvenience in areas where alternate freeze-



\* Field Agricultural Chemicals Research, The Dow Chemical Company, South Haven, Michigan.

AGRICULTURAL CHEMICALS

#### In the Photos

(Page 34) Treatment of brush over three feet high should be made as a basal spray from ground up to point approximately knee-high. All exposed and apparently alive portions of old stump should also be treated.

(This page, Upper photo) Power line right-of-way kept clear of brush through use of chemical herbicides.

(Lower photo) Sprouting stump susceptible to 2,4,5-T application in dormant season. As indicated above, application should be made close to stump and the chemical should be allowed to wet stump thoroughly for best results.

ing and thawing weather is prevalent. One small ice crystal can cause a great deal of trouble in plugging hose lines etc. and under conditions of fluctuating temperatures it is necessary to drain pump, hose lines carefully and often.

#### 2,4,5-T Esters Effective

“ESTERON 245” \*\* has proved to be more effective on many species than 2,4-D when foliage treatments are made. With certain exceptions, it is superior to 2,4-D even in dormant treatments. Table I shows the relative effectiveness of 2,4-D, 2,4,5-T and the mixture of each on a mixed stand of oak sprouts, two years old. Certain species such as willow and buckbrush appear to be equally as susceptible to 2,4-D as they are to 2,4,5-T, however, 2,4,5-T appears to be more effective on such species as ash, maple, persimmon, hawthorn, osage orange, oak and others.

From the standpoint of both cost and effectiveness, 16 pounds of 2,4,5-T acid equivalent in 100 gallons of spray mixture appears to be the most practical concentration. Higher concentrations should be used where mixtures of 2,4-D and 2,4,5-T are applied, when the formulation used has a low percentage of 2,4,5-T. “Esteron Brush Killer” (containing equal amounts of 2,4,5-T and 2,4-D as the propylene glycol ( $C_3H_8O$ ) to

\*\*Dow Trade-Marked product containing propylene glycol ( $C_3H_8O$  to  $C_6H_{14}O_2$ ) butyl ether esters of 2,4,5-T. 4 pounds 2,4,5-T acid equivalent per gallon.



$C_9H_{18}O_3$ ) butyl ether esters) has proved to be effective at concentrations of 24 to 32 pounds acid equivalent in 100 gallons of spray mixture.

As frequently observed and reported, foliage applications of the low volatility esters such as propylene glycol butyl ether esters of 2,4,5-T appear to be more effective than foliage applications of the more volatile esters such as isopropyl, butyl and amyl. Table 2 presents data showing the superior effectiveness (at practical concentrations) of the propylene glycol butyl ether esters of 2,4,5-T over the isopropylamyl esters on dormant oak sprouts, averaging three feet high.

Mullison et al (5) report increased activity of these new compounds determined by careful tests on greenhouse plants and later substantiated by field results on such species as ash, maple, oak and a number of perennial weed species. He concludes that "they (the propylene glycol butyl ether esters) may not show this superiority on all species, under all conditions particularly those favorable for good kill." They seem to be particularly valuable when the going gets tough.

#### Basal Applications Good

**A**PPPLICATION technique and diligence are keys to good results. Treatment over the entire plant sometimes appears to be more effective than basal treatments, but in any instance the difference on brush 3 feet or more high is very small and generally not worth the additional cost. On small brush, under three feet high, the additional cost of overall treatment is negligible and frequently pays dividends in increased control. Treatment of brush over three feet high should be made as a basal spray from the ground up to a point approximately knee high. In all instances it is particularly desirable to wet all exposed and apparently live portions of the old stump at the same time. The basal area appears to be the important point to spray and it should be thoroughly wetted on all sides. Treat-

ments on the upper 18 inches only of 3 foot sprouts were not as effective as basal treatments (fig. 1) and for this reason treatment of sprouts in deep snow (12 inches or deeper) appears to be a questionable practice. This is not necessarily true of tall brush or trees.

Treatment with knapsack or low pressure equipment using solid cone nozzles is most economical but orchard guns with a No. 5 or similar diac work satisfactorily at 150-200 pounds pressure. The "Ashbaugh Wand"<sup>1</sup> has been developed as a specialized nozzle unit for the purpose of dormant spraying in reduced populations and is now in commercial use.

While this discussion is primarily concerned with dormant treatments, it should be pointed out that basal applications are also effective during summer months. Concentration carriers and application techniques are essentially the same as those for dormant spraying. However, its practical use will probably be more restricted than dor-

mant treatments. The difficulty in getting through heavily foliated brush and dense stands of weeds reduces the efficiency and morale of spray crews, resulting in an expensive operation which can normally be done cheaper by conventional high volume foliage sprays. The major function of summer basal sprays would seem to be the spot spraying of resistant species in areas which have already been "opened up" by previous high volume foliage treatments.

#### Timing Treatment

**I**N general, control of sprouts has been satisfactory when applications have been made any time after the sprouts become dormant. There is some disagreement about the effectiveness of early fall treatment. Some investigators feel that late winter applications are best and others have very good evidence that fall treatments are best. In any event, treatments at all seasons have given satisfactory brush control and no

(Turn to page 99)

**Table 1**  
Percentages\*\* of oak sprout units showing no live sprouts 7 months after treatment.

Materials	Pounds acid equivalent/100 gallons of fuel oil					
	4	8	12	24	32	40
2,4,5-T (24% trichlorophen- oxyacetic acid)	36.3	47.0	72.6	78.5	83.3	89.9
2,4-D (2,4 dichlorophen- oxyacetic acid)	9.5	12.0	53.4	55.4	58.0	—
Mixture equal amts. of 2,4,5-T and 2,4-D	32.8	53.5	52.5	60.1	77.1	83.1

\* All materials used as propylene glycol ( $C_3H_8O$  to  $C_9H_{18}O_3$ ) butyl ether esters of the indicated acids.

\*\* Data represents mean percentages from four experiments.

**Table 2**  
Percent of Oak Sprout Units Showing No Live Sprouts 7 months After Treatment

Esters of 2,4,5-T	Acid equivalent/100 gallons of fuel oil				
	4	8	16	24	32
Isopropyl-Amyl**	13.5	18.5	15.0	29.5	87.4
Propylene ( $C_3H_8O$ to $C_9H_{18}O_3$ ) glycol butyl ether	14.7	15.2	68.4	80.6	89.0

\* Use 4 gallons of "Esteron 245" in 96 gallons of oil.

\*\* 32.3% Isopropyl ester of 2,4,5-T and 11.7% amyl ester of 2,4,5-T

# Statutory Control of PESTICIDES

by

**Wayne D. Hudson**

(Reprinted from Food Drug Cosmetic Law Journal)

Chicago, Illinois

**G**ROWING concern and numerous questions accompany the rapid development of synthetic chemicals for use in connection with the production of the nation's food supply. Are we discriminate in using these new materials? Does our knowledge of their toxicological properties keep pace with their use? These and other questions are being asked from many sides.

The Delaney Committee, authorized by House Resolution 323, has held public hearings for many months, hearing the testimony of persons prominent in the agricultural and toxicological field. The work, said to be the most important yet conducted in furtherance of the food aspect of the Federal Food, Drug and Cosmetic Act,<sup>1</sup> has brought out a number of heretofore unpublished facts. Early in its hearing, the Committee issued an interim report with the following conclusions:<sup>2</sup>

The increasing use of chemical additives in the production and processing of food has raised a serious problem so far as the public health is concerned. The evidence so far presented indicates that existing Federal laws dealing with the use of chemicals in food are not adequate to protect the public against the addition

of unsafe chemicals. It is important, of course, that unnecessary obstacles to technological improvements in food production and processing not be created. As indicated, most witnesses before the committee testified strongly that a chemical synthetic should not be permitted to be used in the production, processing, preparation, or packaging of food products until its safety for such use has been established, and that the food chapter of the Federal Food, Drug, and Cosmetic Act should be amended to include a section generally similar to the New Drug Section of that Act. In view of the far-reaching consequences of such an amendment, the committee is of the opinion that individuals and groups who would be affected by such legislation should be given further opportunity to present their views and to comment on proposed legislation before any specific recommendations are made to the Congress.

## Committee Wants USDA Testimony

**T**HE committee emphasizes that further study and investigation are required before any final conclusion can be reached. It is especially interested in the receipt of testimony from the various bureaus of the United States Department of Agriculture. Too, the various farm organizations such as the National Farm Bureau and the National Grange have yet to express their views. (A number of officials of the U.S.D.A. and the counsel of the National Grange have since testified.)

The "chemical additives" which present a potential public

health hazard are: pesticides, including insecticides, fungicides, acaricides and weedicides; plant growth regulators; fertilizers; chemicals used as additional ingredients, ingredient substitutes, preservatives, antioxidants, mold inhibitors, emulsifying and other types of agents added to food during processing or storage; chemicals used to wash utensils in food processing; wax coatings, resins, plasticizers and other ingredients of packaging materials.

## Questionable Terminology

**S**OME may question the wisdom of the use of "chemical additive" as a collective term for the chemicals under investigation. The term has no meaning apart from the content. The content is so diverse that the term serves only to hinder a pragmatic inquiry into the legislative need. The indiscriminate use of the term by the Delaney Committee depreciates the value of the hearings held. Where the term was used by the interrogator, it was often impossible to ascertain the central thought. In turn, it is impossible to evaluate the answer given. It is manifest that the problems in the manufacture and use of pesticides are vastly different from those in the field of food fortification during processing.

A proposed amendment to the Food and Drug Act, submitted to the Delaney Committee by the Food and Drug Administration, deals with all of these chemicals under the single definition of "chemical additives."<sup>3</sup> A proposed section molded after the new-drug section, provides, in effect, that proof of the harmlessness of a chemical additive be submitted to the Administration in advance of the introduction to commerce. May it not be fundamental error to hypostatize these chemicals with their divergent occurrences and purposes, by subsuming them all under one statutory definition? May it not be fundamental error to control their use with a single legislative directive no matter how broad?

1. Charles Wesley Dunn, speaking before the sixth Annual Meeting of the Section on Food, Drug and Cosmetic Law of the New York State Bar Association.

2. H. R. Rep. No. 3254, 81st Congress, 2nd Session; 6 Food Drug Cosmetic Law Journal 149 (1951).

3. Hearings before Committee on Chemicals in Food Products on H.R. 323, 81st Congress, First Session, p. 246 (1950).

Chemicals used as additional ingredients, ingredient substitutes, preservatives, antioxidants, mold inhibitors, emulsifying and other types of agents added to food during processing, are, in a true sense, chemical additives. They are directly added to and made part of the food itself while it is being prepared for consumption. What goes into the food at this stage is eaten by the consumer.

#### Opinions of Authorities

**I**N his testimony before the Delaney Committee, Dr. Roy C. Newton of Swift and Company made the following statement: "It is my conviction that any food processor bears a moral obligation not to change the food supply by addition of chemicals or by chemical processing until he has provided adequate proof in the form of scientific studies by competent scientists proving the non-poisonous character of a proposed process or addition. It would appear to be in the public interest to require food processors to avoid such chemical additions of chemical processing until sufficient evidence has been acquired to prove that such additions or process is harmless."<sup>4</sup> The statement would seem to apply with cogency to this category of true chemical additives.

Dr. James R. Wilson, Secretary, Council on Foods and Nutrition, American Medical Association, on the question of what is a safe food, stated: "First, nutritive value must be such that the food makes its expected contribution to the maintenance of health. We believe it is desirable and possible to produce such food without the addition of synthetic chemical nutrients."<sup>5</sup>

#### Dunbar on Toxicity

**T**HE justification for the intentional addition of chemicals to food is in the positive contribution they make to the food they are applied to. A chemical with toxic properties, acute or chronic, can make no such contribution. Toxic propensities often cannot be known without exhaustive long-range toxicological studies. Perhaps this justi-

fies the following statement of Dr. Paul B. Dunbar, Commissioner of Food and Drug Administration: "I feel that no new chemical or no chemical that is subject to any question as to safety should be employed until its possible injurious effect, both on an acute and on a long-time chronic basis, has been shown to be nonexistent. In other words, any chemical that is proposed for use ought to be proved in advance of distribution in a food product to be utterly and completely without the possibility of human injury."

#### What About Pesticides?

**W**HETHER, such a burden cannot be justified. Dr. Dunbar subsequently indicated that he meant his statement to cover pesticides. It may be doubted that he had pesticides in mind when he formulated the statement, but this remains a matter of opinion. Complete security in this area is a dream which awaits the millennium. Pesticides are not chemical additives in any true sense. They are chemicals, predominantly of a poisonous character, used to protect plants and animals from insects and other pests. The inclusion of pesticidal residues in consumer food results from unsuccessful removal rather than voluntary addition. Their presence in consumer food is contamination from a necessary activity in the production of food which is distinctly separate from the processing of the feed once grown.

#### Need for Toxic Pesticides

**T**HERE is general recognition of the necessity for the use of toxic pesticides. Too, there is general acceptance of the fact that some toxic residue will find its way into consumer food. There is, however, a natural rebellion against this state of affairs, which stems in part from a failure to appreciate the extent of the necessity which we face. Those failing to appreciate fully the necessity are prone to call for a standard

of statutory control impossible of attainment. The comments of eminent naturalists apply with force.

The struggle between man and insects began long before the dawn of civilization has continued without cessation to the present time, and will continue, no doubt, as long as the human race endures. It is due to the fact that both man and certain insect species constantly want the same things at the same time. Its intensity is owing to the vital importance to both, of the things they struggle for, and its long continuance is due to the fact that the contestants are so equally matched. We commonly think of ourselves as the lords and conquerors of nature, but insects had thoroughly mastered the world and taken full possession of it long before man began the attempt. They had, consequently, all the advantage of a possession of the field when the contest began, and they have disputed every step of our invasion of their original domain so persistently and so successfully that we can even yet scarcely flatter ourselves that we have gained any very important advantage over them. Here and there a truce has been declared, a treaty made, and even a partnership established, advantageous to both parties of the contract—as with the bees and silkworms, for example; but wherever their interests and ours are diametrically opposed, the war still goes on and neither side can claim a final victory. If they want our crops, they still help themselves to them. If they wish the blood of our domestic animals, they pump it out of the veins of our cattle and our horses at their leisure and under our very eyes. If they choose to take up their abode with us, we cannot wholly keep them out of the houses we live in. We cannot even protect our very persons from their annoying and pestiferous attacks, and since the world began, we have never yet exterminated—we probably never shall exterminate—so much as a single insect species. They have in fact, inflicted upon us for ages the most serious evils without our even knowing it.<sup>6</sup>

It is difficult to understand the long-time comparative indifference of the human species to the insect danger—Men and nations have always struggled among themselves. But—there is a war, not among human beings, but between all humanity and certain forces that are arrayed against it. Man—has subdued or turned to his own use nearly all kinds of living creatures. There are still remaining, however, the bacteria and protozoa, that cause disease and the enormous forces of injurious insects which attack him from every point and which constitute today his greatest rivals in the control of nature—If human beings are to continue to exist, they must first gain mastery over insects—Insects in

6. Footnote 3, at p. 26.

4. Footnote 2, at P. 156.  
5. *Food Drug Cosmetic Law Quarterly*, 86 (1949).

7. Forbes, *The Insect, the Farmer, the Teacher, the Citizen, and the State*; See, Metcalf and Flint, *Destructive and Useful Insects* 1 (2nd Ed., 1939).



this country continually nullify the labor of one million men. Insects are better equipped to occupy the earth than are humans, having been on the earth for fifty million years, while the human race is but five hundred thousand years old.<sup>8</sup>

To anyone who has never experienced or witnessed any great injury by insects these statements may sound extreme. They do not harmonize with our magical belief in science. In the protection of our ideals we recognize that our methods are primitive. In the protection of our physical selves we feel we have a better answer. The answers of science are limited, however, and any statutory control of pesticides must recognize that limitation.

#### Advance of Mormon Cricket

I HAVE witnessed what insects I can do. As a boy I lived in a small rural community in Idaho. Ever since the settlement of the Rocky Mountain area, the mormon cricket has periodically overwhelmed the agrarians of that region. From native breeding grounds in the hills these crickets migrate into the arable land of the valleys. They eat field and garden crops, small fruits, legumes and especially the young heads of grain. A serious outbreak of these pests in the Great Salt Lake basin in 1949 was terminated so spectacularly by great flocks of gulls that the grateful settlers erected a monument in commemoration.

In 1937, a black horde of these inch-long insects descended upon my community. They traveled in a band covering about one square mile of area with from one hundred to four hundred insects per square foot. They moved about a mile a day, eating almost everything in their path with a seemingly insatiable appetite. The highways were posted with caution signs because the asphalt was like a ribbon of grease from the crushed bodies of the crickets. Federal, state and industry entomologists gathered to help farmers fight the invaders. Every known means was used. Artificial barriers and traps were erected in the path of the in-

sects. Oil was put in streams to impede their crossing. Tons of the most effective chemicals known were applied. The insects continued their devastating forage while entomologists scratched their heads helplessly, for science had no answer here. Needless to say, there was no poisonous-residue problem on food from that area.

The usual insect which the entomologist fights is not as spectacular as the mormon cricket. The more serious insect pests are those that feed on a particular plant. Man upsets the balance of nature by planting huge fields in one crop, thereby providing a feast on a platter for the insect liking that particular food. Year after year we battle with them to bring the crop to maturity. The problem of entomology is one of the most difficult found in all of the applied sciences. Even so, the most common public conception of an entomologist is of a little man with flat chest, horned-rim glasses, curved stem pipe, and insect net, chasing through the fields after a butterfly.

#### Codling Moth Saga

THE need for poisonous chemicals in the fight against the insect is a dynamic one. The problem is not one where, having found a chemical which gives effective control, we can rest content on our laurels. There must be a continuing progress of discovery of effective new chemicals. A brief history of the control of the codling moth, the larvae of which is the common apple worm, will provide a typical illustration.

The use of arsenate of lead for apple-worm control began around the turn of the century. One or two sprays would give an effective check on the apple worm. As time went on, the insects, with their environmental conditions, developed resistance to the control chemical. More and more spray applications were needed.

During the twenties a public scare developed over the residues of lead and arsenate that remained on

food. Tolerances were set by the Department of Agriculture. The lowest tolerance issued was in 1932. I can remember once-proud Idaho orchards being pulled out by the roots because farmers could not meet the tolerances. Later, Public Health Service studies showed these tolerances to be much too restrictive. Prior to World War II, the orchards in the northwest were white from the application of a dozen sprays in a single season. By that time the pest was very resistant to the spray used.

#### DDT—Popularized Panacea

THE war brought the development of DDT, the popularized panacea for the insect problem. It is now the subject of medical concern. DDT was a wonderful control for the codling moth. One application gave an effective check. However, serious complications arose—DDT killed the mite destroyer, the natural predator of the red spider mite but did not, however, kill the red spider. The spider mites attacked the leaves of the fruit trees. No longer held in check by their natural enemies, the mites increased in great numbers, promising to be a greater problem than the codling moth ever was. So goes the fight against the insect.

What then is our position with respect to statutory control of pesticides? A food may be rendered harmful in the process of saving it from destruction. If so, the end result may be a negative one. Statements to the effect that if any regulation is imposed the insects will leave no food for consumption, are as extreme as those which assert that we are committing mass suicide by the ingestion of pesticidal residues. The entomologists, the farmers and the pesticide industry would welcome a unified, workable regulation that is in accord with the realities of the situation.

#### Insecticide Act Provisions

PESTICIDES are now subject to the Federal Insecticide, Fungicide, and Rodenticide Act,<sup>9</sup> administered by the Secretary of Agricul-

<sup>8</sup> Howard, *The War Against the Insects*; See, Metcalf and Flint, work cited at footnote 7.

ture. He has delegated authority for administration and enforcement to the Director of the Livestock Branch, Production and Marketing Administration, United States Department of Agriculture.

The insecticide act is similar in several respects to the drug chapter of the food and drug act. False and misleading labeling results in forbidden misbranding. The label must bear directions for use when public necessity requires it. Adequate warnings and safeguards must exist to protect users from injury. Exemption is made for the shipment of poisons for investigational use. Guarantee provisions protect from penalty those who buy and resell in unchanged form. As with new drugs, pesticides must be registered.

The insecticide act is not, however, directed at the danger from pesticidal residues. Regulations under this act state, "the purpose of the act and the regulations in requiring proper registration and labeling of the regulated substances is to protect the purchaser or user of such substances."<sup>9</sup> It is primarily designed to protect farmers, home gardeners and commercial applicators from acute poisoning and from economic cheat.

Existing public protection from excessive adulteration of food by pesticidal residues lies appropriately in the Federal Food, Drug, and Cosmetic Act. The statute authorizes the setting of tolerances.<sup>10</sup> Limits may be put upon the amount of poison allowable in food. These limits are to be held to levels which will protect the public health.

If tolerance provisions actually worked in practice, the public would be adequately protected. This is so because the health hazard is not one of acute poisoning from pesticidal residues but chronic poisoning, resulting from the continuous ingestion of minute amounts over a long period of time.

#### Real Toxicological Question

A REAL toxicological problem is presented, but the toxicological question is not whether a chemical

is poisonous or whether it remains on the food; it is how much remains, how much is consumed and how much the human body can deal with. The propensity of many of the pesticides for chronic poisoning is largely in the realm of the unknown. Though we have fifty years of experience with lead arsenate we have only recently acquired comprehensive knowledge of the effect on the public of its widespread use. Because of this dearth of necessary toxicological information, the tolerance provisions are found wanting.

How are we to develop the needed information? A very important consideration here is the shortage of facilities and trained personnel. The complicated nature and scope of the task involved is shown by the procedures outlined by scientists of the Food and Drug Administration.<sup>12</sup>

In spite of its importance, toxicology is said to be one of the weakest branches of modern science, and education in the field is on a very limited scale.<sup>13</sup> With mobilization demands upon manpower, especially the technically skilled segment, this situation is not likely to improve for several years. Legislative burdens should be considered in the light of this limitation.

#### Begin with Industry?

MANY propose a statutory control similar to the new-drug section. This would place the burden upon the pesticide manufacturer to prove the safety of a pesticide before introducing it into commerce. In administering the new-drug section, a new drug is considered safe if its beneficial aspects outweigh its propensity for harm. Here the determination is relatively easy. It concerns the effect of specified dosages over a determinate period of time.

With pesticides, however, the determination of this question is suf-

ficient to baffle the most experienced and sagacious investigator or protector of the public welfare. Yet the question remains and some effort should be made toward answering it. Perhaps the beginning should lie with industry. Statutory demands should be modest, however.

Part of that demand might properly be the supply of data on methods of quantitative analysis of residues. The removal of toxic pesticidal residues is an essential function in supplying healthful food to consumers. It is a function that falls to the food processor and is a responsibility from which he cannot be relieved. Essential to this function, however, are methods for determining the kind and amount of residue present on the marketed raw food. It would seem that this knowledge could best originate from those who develop the chemical for use. The failure to produce such methods should not be grounds for refusing registration. Rather, the criterion should be whether or not the ways open to science for the determination of such methods have been reasonably exhausted.

#### Require Minimal Tests

IN the absence of positive proof that no toxic residue remains on the raw food at harvest time, limited toxicological studies could be required. These studies should be minimal, consisting of no more than simple, standardized rat-feeding studies. Such studies will not establish a chemical as safe for use—only a rough estimate of the probable effect on man will be afforded. Nonetheless, the Administrator will be able to make a decision on concrete data.

If the pesticidal chemical produces extreme effects on the experimental animal, registration can be refused pending more favorable tests on other animals. If the studies create a substantial doubt as to safety, the chemical can be given a limited registration. Its use can be restricted to certain geographical regions, or to certain crops, or exclusive of certain crops, and so on. This will re-

(Turn to page 92)

9. Public Law 104, 80th Congress, 7 USC Sections 135ff. Approved June 25, 1947.

10. 7 CFR Section 162.100 (1949 Ed.).

11. Section 406 (a.).

12. Lehman, Laug, Woodard, Drainie, Fitzhugh and Nelson. "Procedures for the Appraisal of the Toxicity of Chemicals in Foods," 4 Food Drug Cosmetic Law Quarterly 412 (1949).

13. Footnote 2, at p. 741.

# Natl. Agricultural Chemicals Association

In 18th Annual Meeting at  
Spring Lake, N. J., Sept. 5-7

**T**HE 18th annual fall meeting of the National Agricultural Chemicals Association will be held at the Essex and Sussex hotel, Spring Lake, N. J., September 5-7, according to Lea S. Hitchner, executive secretary of the association. Representatives of various branches of Government will feature the morning session of September 5, the advance program stated. In addition, the annual reports of Mr. Hitchner and president Ernest Hart, Niagara Chemical Division, Food Machinery Corp., will be heard.

From Government agencies, the following persons are expected to be on the program September 5, at which Arthur W. Mohr, California Spray Chemical Corp., vice-president will preside:

P. H. Groggins, Chief, Agricultural Chemicals Section, Chemical Div., NPA, U.S. Dept. of Commerce; Thomas H. McCormack, Chief, Rubber, Chemicals & Drug Div., OPS,

Economic Stabilization Agency; Howard J. Grady, Chief, Agricultural Chemicals Section, Rubber, Chemical & Drug Div., OPS, ESA; L. B. Taylor, Director, Office of Materials and Facilities, Production & Marketing Administration, USDA; and William



L. S. HITCHNER



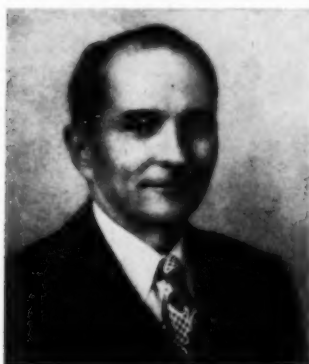
J. A. WOODS

The annual banquet will be held that night, with J. Albert Woods, president of Commercial Solvents Corporation, as speaker, Ernest Hart will preside as toastmaster.

Friday, September 7 will present a program surrounding the general theme, "What is before us?" The tentative program, issued in July, called for the following speakers: Dr. H. L. Haller, Ass't. Chief, Bureau of Entomology & Plant Quarantine, USDA; Dr. H. E. Longenecker, Dean, The Graduate School, The University of Pittsburgh; Dr. Firman E. Bear, Chairman, Soils Dept., Rutgers University; Gus M. Oehm, Director of Public Relations, Pineapple Research Institute of Hawaii; and Jack Vernon, Vice-Pres., Niagara Chemical Division, Food Machinery & Chemical Corp.

The Association states that ladies are "especially invited," and a committee for their entertainment is being appointed. Morning sessions start at 10, the program says. The annual golf tournament will be held on Thursday afternoon with prizes being awarded that evening at the banquet program.

H. J. GRADY



R. Allstetter, Deputy Director, Materials and Facilities Division, Production & Marketing Administration, USDA.

## Member Meeting Thursday

**E**D. Phillips, G L F Soil-Building Service, New York, will preside at an open forum meeting September 6, restricted to NAC members only. The Association points out that this session will offer opportunity for questions and suggestions as well as to discuss problems of the Association and industry.



GEORGE V. TAYLOR

## Corn . . .

# A Potential User of FERTILIZER\*

**T**HE importance of corn as a potential market for more and more plant food materials should be a matter of particular interest to the fertilizer trade. Production of bumper corn crops requires great quantities of nitrogen, phosphate and potash, and a study of population trends in the U.S. indicates that tremendous quantities of corn will be needed for years to come to maintain an adequate food supply.

Although less than 4% of the corn crop is consumed directly by human beings, yet the total corn crop is devoted almost exclusively to the feeding of humans, either directly or indirectly.

How many bushels of corn does the average person consume annually? Assuming that the postwar years of 1946-49 are representative, the average per capita consumption is approximately 22 bushels. With the population of the United States increasing at its present rate, 1960 will find some 175 million persons in the nation. Thus, by that year, we will require about 3,860,000,000 bushels of corn annually! This yield will carry off the land in the ears alone, some 1,800,000 tons of nitrogen, 800,000 tons of phosphate and about 650,000 tons of potash—an increasing portion of which will have to be supplied from commercial fertilizer sources.

On the other hand, it is dif-

ficult to extend figures and trends too far, because the per capita consumption of corn is not necessarily constant. There has been a substantial increase in per capita consumption of meat and dairy products, the latter trend having been noted since 1913. There is reason to believe that the consumer will continue to increase his use of these products if he feels financially able to do so. Studies of how people spend their disposable income for various food types, indicate that seldom, if ever, will the consumer value a food type so highly that he will increase the proportionate share of his income to purchase more of it. In other words, if the consumption per capita of meat, poultry and dairy products is to be stimulated, this must be accomplished by reducing the price of these commodities in relation to the purchasing power of the consumer.

How great will be the demand, therefore, for corn-fed products, will depend to a considerable extent on the economies of the situation. It seems doubtful that demand will increase much over the 16% population increase expected in the next decade.

### Fertilizer Outlook Good

**B**UT the outlook for fertilizer application is more favorable. The depletion of soil reserves of plant food elements is widely recognized, and these losses must be made up largely through the application

of more and more fertilizer. The per capita consumption of plant food since 1900 has increased to such an extent that a graph showing the figures presents a graphic picture of our increasing dependence on commercial plant food sources. If current trends continue, it appears that by 1960, the per capita consumption of phosphoric acid will exceed 40 pounds per year, while nitrogen and potash will approximate 23 pounds annually. With a population of 175 million, the requirements in fertilizer for all purposes would exceed 2 million tons of nitrogen and potash and would reach approximately 3½ million tons of available phosphoric acid.

It should be recognized, however, that the increase in per capita plant food consumption reflects not only the depletion of soil reserves, but also the extent to which American agriculture is becoming intensive in nature. The attraction of higher profit is driving the American farmer to increase productivity through the increasing employment of technology and specialization. The use of fertilizer in such a system to lower production costs rather than to increase total output will be the principal consideration in the remainder of this study. It is believed that fertilizer can gain the same acceptance which has been accorded hybrid corn, since inherently, the two

\* From Paper Presented at National Fertilizer Ass'n. Meeting, White Sulphur Springs, W. Va., June 11, 1951.

by  
**George V. Taylor**

Spencer Chemical Company  
Kansas City, Missouri

are alike in that they represent cash outlay for operating supplies motivated by a desire to achieve higher production rates per acre.

The author felt (for some time) the use of last season's cash income as a basis for figuring this year's expenditure for fertilizer, to be inconsistent with an expanding market.

Cash farm income is a brake on consumption in that funds are necessary for the purchase of fertilizer, but it is absurd for a farmer to purchase fertilizer simply on the basis that he can "afford" it. Actually, it is not farm income, primarily, which spells success to the grower, but rather, the margin between his income and his production costs. Since the price at which he can sell his product is largely beyond his con-

trol, his sole hope of improving his margin of profit lies in reduction of costs! With this in mind, we will now proceed to examine the farmer's production costs in the raising of corn.

The U. S. Department of Agriculture in cooperation with state authorities throughout the country is currently collecting and evaluating data on response of the various crops to nitrogen, phosphate and potash by states and regions. We have been assured that *Fertilizer Corn for Higher Yields*, Bulletin #366 of the North Carolina Agriculture Experiment Station contains data fairly representative of responses generally in the Southeast. In addition, data were secured which are considered applicable to the Corn Belt. It should be noted, however, that the Corn Belt data are adjusted to average farm conditions, whereas the North Carolina or southeastern data may have a favorable bias because cooperating farms are usually of better quality as to land and management. For this reason the southeastern data may show disproportionately well.

#### Difficult to Calculate

ESTABLISHING the required rates of application for phosphate and potash corresponding to the nitrogen rates and yields calculated presented a considerable problem. It was learned that in south-

eastern experiments generally, responses to phosphate and potash are difficult to establish primarily because corn usually follows crops heavily fertilized with phosphate and potash. Common sense, however, indicates that corn should bear the cost of the phosphate and potash removed in the grain. It was judged that over a long period little phosphate will be lost because that which is fixed in the soil on application will become available over a period of time. It is believed that this is only slightly less true of potash where some leaching losses may occur. Accordingly, the long term uptake efficiencies of phosphate and potash were fixed at 80% and 67% respectively and  $P_2O_5$  and  $K_2O$  were charged against increased yields at 0.5 pounds each per bushel of yield produced. In the case of current average yields plant foods were included at the fertilizer level indicated by the National Fertilizer Association's 1950 estimate and the average plant food composition in fertilizers as indicated by Scholl and Wallace for 1948-49.

Examination of available records shows that N,  $P_2O_5$ , and  $K_2O$  valued at \$.13, \$.11 and \$.10 per pound in the Corn Belt and \$.13, \$.08 and \$.07 per pound in the Southeast roughly approximate 1950 price levels in all fertilizers. Unless the agronomic data used are heavily biased, the Southeast shows a potential

FERTILIZER, LIME & SEED AS PERCENT OF TOTAL COST OF PRODUCTION  
INDEX (1933 = 100)

Year	N.C., S.C., Ga. Fla., Ala., Miss.				Ohio, Mich., Wisc., Minn.				Ill. & Iowa				Mo. & Nebr.			
	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed	Fert. & Lime	Seed
	%	Index	%	Index	%	Index	%	Index	%	Index	%	Index	%	Index	%	Index
1933	10.6	100.0	2.1	100.0	10.1	100.0	1.5	100.0	5.7	100.0	1.7	100.0	3.6	100.0	1.8	100.0
1934	9.3	87.7	2.3	109.5	12.8	126.7	1.5	106.7	7.3	128.1	2.0	117.6	1.7	47.2	.9	50.0
1935	10.1	95.3	2.2	104.8	12.3	121.8	1.9	126.7	8.1	142.1	2.3	135.3	4.1	113.9	2.1	116.7
1936	10.6	100.0	2.0	95.2	12.6	124.7	1.6	106.7	7.5	131.6	2.0	117.6	2.9	80.6	1.0	55.6
1937	11.3	106.6	2.6	128.8	12.3	121.8	2.1	140.0	7.5	131.6	3.1	182.3	4.8	133.3	2.7	150.0
1939	9.7	91.5	2.3	109.5	12.4	122.8	2.7	180.0	7.3	128.1	3.7	217.6	4.6	127.8	3.0	166.7
1941	8.7	82.1	2.4	114.3	11.5	113.9	3.3	220.0	6.8	119.3	4.3	252.9	4.0	111.1	4.3	238.9
1942	7.7	72.6	2.2	104.8	11.6	114.8	3.3	220.0	6.7	117.5	4.2	247.1	3.7	102.8	3.8	211.1
1943	6.8	64.2	2.0	95.2	10.8	106.9	3.1	206.7	6.4	112.3	3.8	223.5	3.5	97.2	3.9	216.7
1944	7.7	72.6	2.0	95.2	10.7	105.9	3.4	226.7	6.2	108.8	3.9	229.4	3.1	86.1	4.0	222.2
1945	8.3	78.3	1.9	90.5	10.3	102.0	3.3	220.0	6.4	112.3	3.9	229.4	3.2	88.9	4.4	244.4
1946	8.8	83.0	1.9	90.5	10.4	103.0	3.4	226.7	6.3	110.5	4.0	235.3	3.5	97.2	4.5	250.0
	10.6=100	2.1=100			10.1=100	1.5=100			5.7=100	1.7=100			3.6=100	1.8=100		



for low corn prices superior to the Corn Belt with a low of 53¢ per bushel compared to 63¢ for the Corn Belt. I have been told that such a conclusion is not unreasonable in view of the lower land, labor and tax rates, longer growing season, and the use of prolific hybrids. If the picture is true, then the Corn Belt will have to look to its laurels in competition with the Southeast. On the other hand, it must be noted that complete mechanization in the southeastern operation has been assumed so that unusual opportunity may be restricted to large farms of good topography.

Using the costs of production per acre at varying yields, market prices for corn were assumed at \$1.75, \$1.50, \$1.25, \$1.00 and \$.75 per bushel to determine the variations in profit per acre at various yields and market prices. The midwestern farmer with a profit of approximately \$47.00 at the average yield of 45 bushels per acre, who increases his yield to 78 bushels, will increase his profit by \$38.00 per acre with \$20.00 worth of fertilizer, if prices are steady. More important, prices may fall to \$1.25 before his

initial profit at average yield is decreased, while such a price reduction would halve profits at the average yield. And the southeastern farmer is even more fortunate. Increase of yield to 88 bushels permits a reduction of price to \$.75 before profits are less than those at average yield and going prices.

It can be seen thus that optimum fertilization offers the individual enterpriser at once a chance at maximum profits and a wholesome insulation against price decline. The optimal use of fertilizer by the progressive farmer to widen the margin between his position and that of the marginal producer, who sets the price, is in my opinion the most salesworthy characteristic of fertilizer. Admittedly, universal optimal use of fertilizer might narrow the cost range between efficient and marginal producer and, through stimulation of production, might cause output to exceed demand to the point where price declines could be substantial. From a sales standpoint, however, this appears to be an unrealistic hypothesis so that the progressive operator will doubtless con-

tinue to enjoy a substantial competitive advantage.

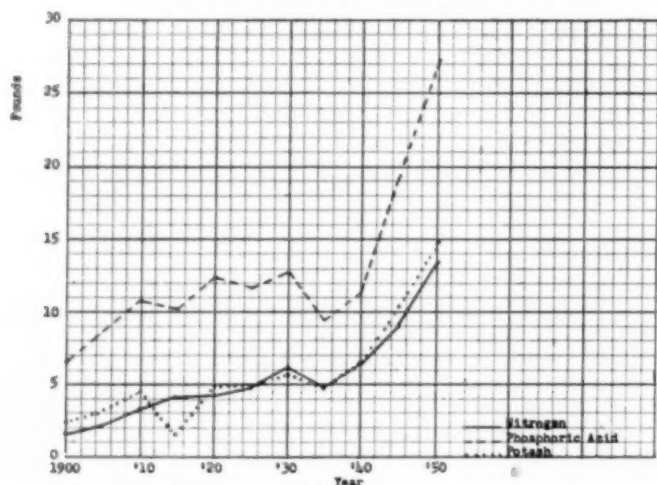
It is my belief that farmers generally regard fertilizer in much the light that the more venturesome of us regard a pair of dice. When expectations are optimistic and prices are high, they incline to plunge a bit in the use of fertilizer. In the Midwest the choice may be whether to use any, while in the Southwest the question may be "how much," but basically the question is one of a gamble, disassociated to a considerable extent in the farmer's mind from his main effort. I believe the reason for this attitude is largely explained by the various degrees to which the farmer charges his operating supplies, taxes, rent, interest on investment, overhead, depreciation and labor to his crops.

At one extreme is the farmer who can afford to view his investment in an acre of corn as the cost of seed, fertilizer, and other direct cash supplies necessary to grow it. At the other, is the possible attitude of a country banker operating his farm as he operates his bank. Between these two examples fall innumerable combinations depending on the operator's background, attitude and situation. I suspect, however, that in evaluating the wisdom of voluntarily increasing cash outlay for production, the average attitude approaches the former more closely than the latter.

Let us consider in these examples the wisdom of investing in fertilizer to increase yields. It is easy to see that the cost of fertilizer speedily dwarfs other costs when these are envisioned in terms of operating supplies, while the proportionate effect of fertilizer is relatively small when costs are fully envisioned as in the second case. Considering fertilizer costs in relation to cash operating supplies only, how may such outlandish increases in cash outlay for fertilizer be justified? Normally, a fair measure of a risk is what potential gain exists for a given amount ventured. In other words, "what are the odds?" The ratio of total income

(Continued on page 99)

## Per Capita Plant Food Consumption



Sources: USDA and Bureau of Census

## Pacific Slope Branch, AAE, Meets

**M**EMBERS of the Pacific Branch of the American Association of Economic Entomologists held a three-day meeting in mid-June in Seattle, Washington. Dr. Raymond B. Allen, president of the University of Washington welcomed the group.

The meeting was addressed briefly by Roy E. Campbell, president of the American Association of Economic Entomologists, by W. A. Ross, president of the Entomological Society of Canada, and by Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine, U. S. D. A.

E. J. Spencer, president of the Entomological Society of British Columbia discussed entomology in that province in both retrospect and prospect. The first government entomologist was appointed in 1911, he said, and now practically the only opportunities for entomologists are in the Federal Service.

G. F. MacLeod of Sunland Industries discussed chemicals for Western agriculture in a defense economy. He pointed out that western plants are in an excellent condition to manufacture and fabricate insecticides provided basic chemicals are forthcoming from eastern chemical plants. Western agriculture has need of chemicals early in the spring while many eastern states are still battling snow. He also discussed the sulfur situation, stating that because sulfur was considered unnecessary on cotton in the south, it was not allocated to western cotton. However the presence of the Atlantic mite on western cotton made the use of sulfur mandatory. Washington officials when informed of this situation, finally allocated sulfur for use on western cotton. This stresses the need of keeping allocation boards in Washington adequately informed, in advance of the needs of western agriculture, he declared.

W. S. McCauley of Julius Hyman & Company, Denver, Colo.,

reported on the status of aldrin and dieldrin in agriculture, stating that, both of these compounds, first synthesized in 1948, are at the present time being tested in some three hundred geographic locations. Dieldrin is more costly than aldrin when compared on a weight to weight basis, he said. Discussing application, he suggested that five weeks should elapse between application of dieldrin and harvest on edible crops. There is, as yet, no established tolerance for either of these materials, but the tolerance of four parts per million has been requested in Washington.

Walter Ebeling, just returned from a year in Hawaii, where he studied the control of the melon fly, reported results of tests using residual sprays on trap crops such as corn borders.

H. H. Crowell of Oregon State College reported on techniques used in residual soil insecticide studies. His results indicate the importance of deep thorough mixing of insecticides in the soil for the control of some pests. Iron filings were used to study the mixing and distri-

bution obtained with various types of tillage equipment, he reported.

H. E. Morrison, Oregon State College, reported on residual insecticides for the control of certain soil pests.

L. C. Terriere, of Oregon State College reported on bioassay of insecticidal residues in potatoes grown in treated soils. Mosquito larvae were used in the bioassay but potatoes were found to be somewhat toxic to the larvae even without added chemicals. Consequently, a method was devised to detoxify the potatoes so that the toxicity of the added chemicals could be measured. The third crop of potatoes, grown in soils treated in 1949, will be studied this fall, he said.

W. W. Yates of the Bureau of Entomology and Plant Quarantine, U. S. D. A. reported on the use of ammonium carbonate to attract house flies. Ammonia given off by decaying horse manure was found to be most attractive to flies. High concentrations of ammonia are repellent to flies whereas low concentrations are attractive. Tests were conducted to determine the effectiveness of ammonium carbonate as an attractant when added to certain organic wastes such as apple pomace, peanut meal, etc.

(Turn to page 85)

Entomologists at the Seattle meeting: (standing, l to r) Roy E. Campbell, president, American Association of Economic Entomologists; Dr. Walter Carter, director, Oriental Fruit Fly Investigations, Honolulu, Hawaii; Dr. W. A. Ross, president of the Entomological Society of Canada; Dr. Curtis

P. Clausen, chairman of the Division of Biological Control, Univ. of California; Louis Gentner, program chairman. Seated (l to r) Dr. Leslie M. Smith, secretary-treasurer; Ed H. Litooy, Colloid Products, chairman and Dr. Glenn E. Carman, vice chairman. Photograph by Better Fruit Magazine.



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Concentrated Superphosphate  
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## V-C phosphate rock products

Phosphate Rock, Ground and Unground  
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## V-C bags

Burlap Bags Cotton Bags  
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Disodium Phosphate	Sodium Metasilicate	



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# The Listening Post

## Treatment of Shortleaf Pine and Loblolly Pine Seed With Fungicidal Dusts

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



ACCORDING to J. R. Hamilton of the Georgia Agricultural Experiment Station and L. W. R. Jackson of the University of Georgia, one of the vital problems confronting foresters in the management of forest nurseries is securing an effective treatment for the control of damping-off diseases. Since the early part of this century, plant pathologists have prescribed a variety of chemical treatments, with varying degrees of effectiveness. The most extensively used treatments have been aqueous solutions of formaldehyde, sulfuric acid and aluminum sulfate, applied to the surface of the prepared beds at the time of sowing. During the past two decades, a variety of fungicidal dusts have been widely used for the control of diseases of field crops, but thus far very few reports have been made on the use of chemical seed protectants for the control of tree seedling diseases. Results of a preliminary study conducted by these workers, to determine the effect of various levels of dosage of fungicidal dusts on the germination and emergence of unstratified seed of shortleaf pine and loblolly pine, are reported below.

The fungicides tested in the experiment were as follows: Arasan, 50% active material, Barbak C, New Improved Ceresan (5% active material), Fermate (20% active material), Phygon (80% active material), Puratized 641, New Improved Semesan Jr. (1% active material),

Yellow Cuprocid (100% active material), and a 1:100 aqueous solution of mercuric chloride. The dosage levels of the dusts used were 1.0, 0.25 and 0.0625 percent of the seed weight. Glass vials of the treated seed were rotated in a small drum with baffles until the seeds were thoroughly coated, which required approximately 460 revolutions. Seed was soaked in the mercuric chloride solution for one minute.

Seed was stratified in a mixture of peat moss and sand for 30 days at 10°C.

The seed were germinated in flats of untreated Norfolk coarse sand. The daily air temperature during the germination period ranged from a minimum of 65°F. at night to a maximum of 80°F. during the day.

A planting of 2 rows of 25 seeds was made of each treatment. Daily counts were made of the emerged seedlings. All of the germination tests were run for a period of 50 days from planting. The tests were run in a split-plot design. Each treatment was replicated 3 times.

### Treatment of Unstratified Seed

**Loblolly pine seed**—The average germination of the control (untreated) was 30.6 percent. The germination in the treated series ranged from a minimum of 16.6 percent for Puratized 641 to a maximum of 38.6 percent for 0.25% Phygon.

The following treatments increased the percentage of germination: 0.25% Fermate; and 0.06% Semesan Jr. The other dosage levels of the fungicides tested did not increase the germination percentage. All of the dosage levels of Yellow Cuprocid, Barbak C, Ceresan and Puratized 641 decreased germination, as did mercuric chloride.

There was not a sufficient amount of damping-off in this series of treatments to determine the relative efficiency of the various fungicides.

**Shortleaf pine seed**—In this series of treatments, the average germination of the control was 57.6 percent. In the treated series, the germination ranged from a minimum of 40.0 percent for 1.00% Puratized 641 to a maximum of 70.0 percent for 0.06% Fermate. The following treatments increased the percentage of germination: 1% Yellow Cuprocid; 0.25% 0.06% Arasan, Barbak C, Fermate, Phygon, Puratized 641, and Yellow Cuprocid; 0.06% Ceresan; 0.25% Semesan Jr. All the other dosage levels of the fungicides, including mercuric chloride, decreased the percentage of germination.

The percentage of damping-off was reduced by the following treatments: 1% Barbak C, Ceresan, Phygon, Yellow Cuprocid; and 0.06% Semesan Jr. Mercuric chloride also reduced damping-off.

### Treatment of Stratified Seed

**Loblolly pine seed**—Germination of the control was 55.2 percent. The germination of the treated series ranged from a minimum of 48.8 percent for 1% Semesan, Jr. to a maximum of 71.4 percent for 0.25% Phygon. The percentage of germination was increased by the following treatments: All the treatments at the 1% level, except Ceresan and Semesan Jr.; all the treatments except Ceresan at the 0.25% level; and all the treatments except Yellow Cuprocid at the 0.06% level.

There was not sufficient damping-off in this series to indicate the relative efficacy of the various fungicides.

all over the country (and abroad, too)

## Insecticides are Blended with Sprout-Waldron equipment



From Trenton, New Jersey . . .  
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ing installation featured in the October,  
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In Lansing, Michigan . . .  
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Accurate production records over three  
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rating for installation. Five distinct for-  
mulas totaling more than 450 tons were  
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**An operator in South Carolina reports:**

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the dust produced on our equipment  
surpasses anything else on the market  
in the South today. Representatives of  
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used by us agree with this opinion. We  
have produced something like 300 tons  
of Chlordane and Toxaphene field  
strength dusts this season on the equip-  
ment and expect to do at least 400 ad-  
ditional tons. We can imagine no bet-  
ter mechanical principle for the proper  
mulling of insecticides than the prin-  
ciple of this mill."

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**Sprout-Waldron**

*Manufacturing Engineers*

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**Shortleaf pine seed**—The average germination of the control was 53.2 percent. Germination of the treated series ranged from a minimum of 36.0 percent for Puratized 641 to a maximum of 68.6 percent for 0.06% Puratized 641.

The following treatments increased the percentage of germination: 1% Fermate, Semesan Jr., and Yellow Cuprocid; 0.25% Ceresan, Yellow Cuprocid, Fermate, and Semesan Jr.; and 0.06% Arasan, Barbak C, Ceresan, Fermate, Phygon, Puratized 641 and Yellow Cuprocid.

The percentage of damping-off was reduced by the following treatments: 1% Fermate, Phygon; all the treatments except Barbak C at the 0.25% level; 0.06% Arasan, Barbak C, Puratized 641, and Yellow Cuprocid.

#### Summary

A STUDY was made of the effect of three dosage levels of each of eight fungicidal dusts on the germination of stratified and unstratified shortleaf pine and loblolly pine seed.

According to the results of this experiment, the 0.25% and 0.06% dosages of the various fungicides resulted in a larger number of emergence increase percentages than did the 1% dosages.

In the unstratified seed series, including both kinds of pine the number of treatments that resulted in increased emergence were as follows: 4 of 16 for 1% dosage, 8 of 16 for the 0.25% dosage, and 7 of 16 for the 0.06% dosage.

In the stratified seed series, including both species, the number of treatments that resulted in increased emergence were as follows: 9 of 16 for 1% dosage, 11 of 16 for the 0.25% dosage, and 14 of 16 for the 0.06% dosage.

For all treatments, including both species, the number of treatments that increased emergence were as follows: 13 of 32 for 1% dosage, 19 of 32 for the 0.25% dosage, and 24 of 32 for the 0.06% dosage.

According to the results of this study, the fungicidal dusts at

particularly the 0.25 and 0.06% dosages, can be used for the treatment of unstratified and stratified seed.

There was not sufficient damping off in the treatment series to yield an evaluation of the relative efficacy of the fungicidal dusts.

#### More Fungicide Tests

E. E. Wilson, of the California Agricultural Experiment Station, reports some observations

made during tests to determine the lethal effects of various chemical preparations on *Erwinia amylovora*, the bacterial cause of fire blight, in which mature but unripe Bartlett pears were utilized. The fruit were dipped into the preparations, placed in glass containers, and held at 70° to 75°F. At such temperatures, the untreated (water-dipped) fruit ripened within seven to eight days. It

(Turn to Page 91)

This column, reviewing current insect control programs, is a regular feature of AGRICULTURE CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U. S. Department of Agriculture's pest surveys extending throughout the United States.

#### By Kelvin Dorward

##### Cotton Insects


IN general, cotton insect pests this year do not appear as prevalent as in the same period of 1950. The boll weevil is as widely

After five and a half years of writing his portion of the "Listening Post," Gilbert J. Haussler has relinquished this responsibility on being named leader of the Division of Truck Crop and Garden Insect Investigations. The Agricultural Chemicals editorial staff expresses appreciation for Mr. Haussler's good work which began with the very first issue of this magazine in 1946. We wish him well in his new position, and welcome our new contributor, Mr. Dorward.—Editors

scattered this year as last, but is generally less abundant; however with July and August being the crucial months, more farmers than ever before are making an effort to control the weevil with insecticides. In Texas, there was a slight increase in the number of punctured squares during early July over late June, but the average count in 89 counties was 9% as compared with 20% at this time last year.

The boll weevil continues to be the most important pest of cotton in Arkansas but the average infestation in the southeastern counties in early July was 8% as compared with 12% for the same period last year. Examination of 228 fields of 36 Oklahoma counties in July revealed in-

festation in 163 fields of 30 counties. Early July rains in Louisiana were favorable for weevil development and control was needed in all sections of the state. Examination in 308 fields in 17 parishes during the first week of July showed 9% punctured squares as compared with 26% during the same period last season. In early July weevils were found in 59 of 88 fields examined in 15 Tennessee counties, although examinations in three of these counties, Franklin, Lake and Obion, failed to reveal any infestation. The weevil population in Mississippi increased slightly in early July, probably because of rain. Forty-four Mississippi counties report weevils with an average infestation of 9% as compared to a 20% infestation at this time last year. Although early July examinations showed weevils in 34 Georgia counties, the infestations were generally light. Examinations during the first week in July of 60 non-poisoned fields of 20 counties in South Carolina, showed a square infestation of 31.8% as compared with 65% for the same period in 1950. Infestations in sixty poisoned fields of 20 counties were about the same, 11.3% and 11.7% for the two years. The eastern and Piedmont areas of North Carolina showed an increase in weevil abundance over late June counts. Although the in-



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sect was generally present throughout the cotton counties of North Carolina, infestation was so light a check of fields was necessary to determine which required insecticides. Early July reports showed an 8.7% weevil infestation in 7 of 8 fields examined in Southampton, Greenville and Nansemond counties.

#### **Pink Bollworm Threat**

**E**VEN though the boll weevil is still the 1951 No. 1 cotton enemy, the pink bollworm is now causing more damage in several Texas counties and threatens serious damage in a dozen or more counties before the crop is harvested. Texas counties showing a higher pink bollworm population than last year are: Atascosa, Bexar, Brooks, Calhoun, Jackson, Jim Hogg, Live Oak, Refugio, San Patricio and Victoria. No pink bollworms had been reported from Louisiana by mid-July.

Bollworms were reported from North Carolina, Mississippi, Georgia, South Carolina, Alabama, Louisiana and Arkansas, with Georgia and Louisiana reporting some poisoning. Cutworms were reported to have caused some damage to cotton in Mississippi and Arkansas, with the yellow-striped armyworm causing damage to cotton in Texas. The garden webworm, sometimes called the "careless weedworm" caused losses to cotton in Texas, Oklahoma, Arkansas, Louisiana and Mississippi during early July.

The cotton leafworm, which by July 1st of last year, had reached Texas, Oklahoma and Louisiana, had not been reported this year in the United States by July 9th. In the irrigated regions of the southwest, all insect damage to cotton was relatively light. In the San Joaquin Valley of California the spider mite had been the most common pest in early July, but the greasy cut worm caused damage in localized areas. In the Coachella and Imperial Valleys, early season infestation of spider mites had practically disappeared by July 1st. Lygus bugs are heavier in the San Joaquin Valley than in 1950, having reached economic im-

portance in early July in the south and east central portions. Although abundant in the Imperial Valley, these pests did not appear to have caused any damage. In Arizona and New Mexico, beet army worms on cotton were controlled with insecticides.

#### **Fruit Insects**

**T**HE codling moth infestation throughout the fruit producing areas was relatively light during late June and early July. Development was retarded in Indiana and the Hudson Valley of New York by cool weather in June. Serious injury by the red banded leaf roller was restricted to comparatively few areas. It was more abundant in June than normal in New Jersey and the infestation was heavier in Massachusetts than last year. Injury from the insect occurred in late June in Western New York and the Hudson Valley of that state.

In late June injury to peaches was caused by the oriental fruit moth in Orange County, New York. First brood larvae of this insect were more abundant in Ohio this year than for the last few years. By July 1st, European red mites were on the increase in fruit areas of New York, Ohio, Indiana and Missouri.

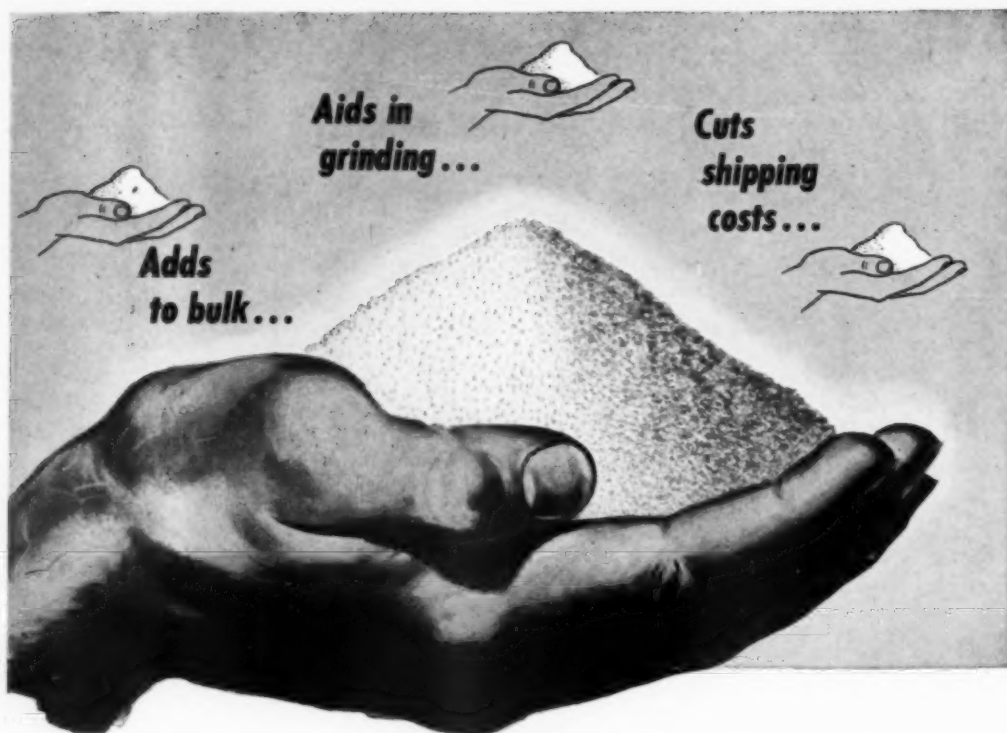
#### **Truck and Veg. Insects**

**D**URING late June to early July, moderate to heavy infestations of the Mexican bean beetle were present in the coastal areas from Alabama to New York as well as in Tennessee and Ohio. There was a heavy infestation of the potato leaf hopper on beans in Maryland, with lighter infestation in Tennessee, Virginia, Ohio, New York, Delaware and North Carolina. Beans in Maine, New York, Washington, Maryland, Idaho, and California during late June were injured by the seed corn maggot. The two-spotted spider mite damaged beans in Alabama, Delaware, South Carolina, Washington and California. Cabbage caterpillars and aphids were generally light in early July. During late June, aphids had been heavy on

cabbage in Ohio and California. Pea aphid populations in early July in Wisconsin and the Blue Mountain districts of Washington and Oregon required large-scale insecticide applications. Lighter infestations were present in New York and the Palouse district of Washington and Idaho. During late June, the pea weevil caused serious local problems in Central New York. Early in July, the tomato fruit worm was locally destructive in Delaware, Florida and Tennessee. Aphids were numerous on Long Island potatoes. The Colorado potato beetle was abundant in Tennessee and numerous in all of the eastern states. Tobacco insects were generally light, with bud worms and hornworms occurring in Georgia, Florida and Tennessee. Grasshoppers caused some damage to tobacco in Florida. Although aphids were infesting tobacco in Georgia, Florida and Tennessee, no noticeable damage occurred.

#### **Corn Borer Status**

**T**HROUGHOUT much of the infested corn borer area the development of the corn borer was ahead of the growth of corn during early July. Cool evenings, wind, and rain decreased egg laying by the moths and the first brood infestation was generally light. By late June, treatment of the earliest field corn was under way in the southern half of the corn belt, but the number of fields needing treatment was low. In early July, egg laying had just started in northwest Iowa but during the latter part of June some fields in the west central area had been treated. In southwestern Indiana the first generation was established by early July, but no serious damage was expected. Very few first brood eggs were being deposited in Kansas by late June. The infestation in Maryland during early July remained light. Tassel damage of both field and sweet corn in New Jersey was light the first part of July, but some control was practiced. By July 15th hatching and feeding by the larvae in southwestern Ohio were underway, with egg laying falling off rapidly.



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AGRICULTURAL CHEMICALS

# ACS September Meeting Includes Symposia on **FERTILIZERS and PESTICIDES**

**S**ESSIONS on fertilizer chemistry and pesticides and a symposium on the current status of pesticides are included in the World Chemical Conclave to be held in New York and Washington, D.C., September 3-15. Cooperating in the event are the American Chemical Society, the International Union of Pure and Applied Chemistry and the International Congress of Pure and Applied Chemistry.

Dr. J. L. St. John will preside at the September 7 morning and afternoon sessions featuring the symposium in the Grand Ballroom of the New Yorker. The program is as follows: "Mode of Action of Pesticides," Robert L. Patton; "Toxicological Procedures Employed in Pesticide Evaluation," by L. W. Hazleton; "Methods for the Evaluation of the Chronic Toxicity of Pesticides," by Francis F. Heyroth; "Toxicological Problems Involved in the use of Insecticides," by S. W. Simmons; "Environmental Health Aspects of Agricultural Pesticides," by Frank Princi; and "Biological and Chemical Evaluation of Pesticides" by James G. Horsfall and Saul Rich.

The afternoon session will include the following papers: "Developments in Aircraft Application of Pesticides" by Kenneth Messenger; "Spray Concentrates in Deciduous Fruit Production," by J. Marshall and J. M. McArthur; "Developments in Machine Application of Pesticides," by W. W. Gunkel and O. C. French; "Pesticides, Laws and the Chemist," by Justus C. Ward; "Selective Control of Animal Pests through Chemistry," by W. W. Dykstra; and "Evaluating the Need for Agricultural Pesticides," by K. Starr Chester.

## Fertilizer Chem. Section

**V**INCENT Sauchelli, Davison Chemical Corp., Baltimore, is chairman and S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., secretary of the Division of Fertilizer Chemistry which will hold a symposium in the Gold Room, Hotel Martinique, New York, Thursday morning, September 6. Dr. Sauchelli will preside at the morning session, with the following program: "Some Phases of Rock Phosphate Mining in the Western Field," by C. W. Sweetwood, Charles Crowley and C. A. Lee; "Grinding Operations as they Affect Acidification of Florida Phosphate Pebble," by Paul D. V. Manning and I. M. LeBaron; "Phosphoric Acid and Elemental Phosphorus in the Fertilizer Industry," by W. L. Hill; "Phosphoric Acid from Low-Grade Phosphates by the Sulfuric Acid Process—Small-Scale Studies," by L. D. Yates and J. G. Getsinger; "Composition and Properties of Superphosphate: Effect of Aluminum and Iron Content Upon the Curing of Superphosphate," by H. L. Marshall and W. L. Hill; and "A Funnel-Type Continuous Mixer for Normal Superphosphate Manufacture," by L. D. Yates and W. B. Williams.

Dr. Thornton will be in charge of the afternoon session, also at the Martinique, at which six papers will be presented. They are: "Quick-Curing of Superphosphate," by G. L. Bridger and E. C. Kapusta; "Some Effects of Fluorine on  $P_2O_5$  Reversion of Ammoniated Superphosphates," by R. C. Datin, E. A. Worthington and H. L. Poudrier; "Characterization of Non-Orthophosphate  $P^{32}$  in Neutron-Irradiated

$KH_2PO_4$ ," by J. H. Borland, A. J. MacKenzie and W. L. Hill; "An X-Ray Diffraction Study of the Citrate-Insoluble Residue from an Ammoniated Superphosphate," by W. J. Hecht, Jr., E. A. Worthington, E. D. Crittenden and A. Northrup; "The Differential Behavior of Incorporations of Potassium as Metaphosphate and Sulfate," by W. H. MacIntire, W. M. Shaw and B. Robinson; and "Fused Granular Potassium Murate and its Properties," by E. W. Douglass and E. A. Schoeld.

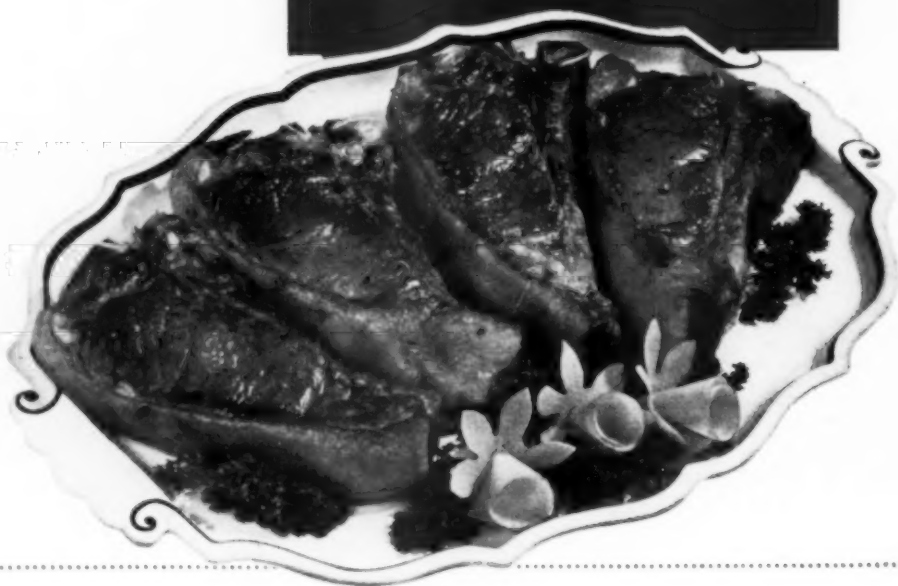
The symposium continues through Friday, with the same chairmen. Papers scheduled for delivery at the morning session are as follows: "Compound Fertilizers from Rock Phosphate, Nitric and Sulfuric Acids and Ammonia," by M. M. Striplin, Jr., David McKnight and T. P. Hignett; "Forms and Solubility of Phosphorus in Mixed Fertilizers," by K. G. Clark and W. M. Hoffman; "Fertilizer Mixing Problems," by Vincent Sauchelli and R. P. Taylor; "Batch Mixing in the Fertilizer Industry," by W. T. Doyle and A. Y. Glynn; and "Technical Problems in Continuous Mixing of Solids and Liquids in Fertilizer Production," by Walter J. Sackett.

Final session of the symposium will be Friday afternoon, with the following papers: "Some Factors Influencing the Efficiency of Fertilizer Conditioners," by J. O. Hardesty and Rikio Kumagai; "The Multiwall Paper Fertilizer Bag—Past, Present and Future," by W. Noyes Baker; "Chemical Reactions Which Occur Between the Trace Element Salts and the N-P-K Carriers in the Fertilizer

(Turn to Page 87)



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# Washington Report

OPS is considering the drafting of price ceiling regulations tailored to the requirements of various segments of the agricultural chemical industries. A series of meetings was scheduled in late July and early August with representatives of the different branches of the fertilizer and pesticide industries to receive their views on the advisability of removing fertilizers and pesticides from control under the General Ceiling Price Regulation and CPR-22 and placing them under specific price regulations.

Six industry committees in the field of fertilizers were drawn up and three committees in the insecticide industry. The committees set up in the fertilizer industry and the dates for their meetings were:

Agricultural liming materials producers, July 17; phosphate rock producers, July 23; superphosphate producers, July 25; nitrogen materials producers, July 27; potash producers, July 30; and producers of mixed fertilizers, August 1.

The discussions centered on setting up tailored regulations for each of these branches of the fertilizer industry and eventually consolidating them into a single regulation. During World War II, the fertilizer industry operated under three ceiling regulations—MPR-135 limited to mixed fertilizers, MPR-205 relating to fertilizer materials, and MPR-386.

Three advisory committees in the field of insecticides were scheduled. One is a committee of producers of DDT and BHC which met July 20th. Another is a committee of the reprocessors and formulators of DDT and BHC insecticides, which met July 24th, and the third is a general committee covering all other insecticides which was to meet August 3rd.

Listed below are the members of the agricultural pesticide industry who were invited by OPS to serve

on the various advisory committees:

\* \* \* \*

## DDT-BHC-OPS Committee

H. C. Davies, Calabama Chemical Co.; Mark Biddison, General Chemical Division, Allied Chemical & Dye Corp.; L. A. Kolker, Kolker Chemical Works, Inc.; Charles Gerlach, Michigan Chemical Corp.; H. C. Koehler, Monsanto Chemical Co.; P. Rothberg, Montrose Chemical Co.; E. R. Cashman, E. I. duPont de Nemours & Co.; Carlos Kampmeier, Rohm & Haas Co.; Dr. Oskar Frey, Cincinnati Chemical Co.; R. S. Roeller, Pennsylvania Salt Manufacturing Co.; Wm. J. F. Francis, Pennsylvania Salt Manufacturing Co. of Washington; Jack Vernon, Niagara Chemical Division, Food Machinery and Chemical Corp., and W. F. Newton, Southern Alkali Corp.

## BHC-DDT Reprocessors and Formulators Committee

B. P. Webster, Chipman Chemical Co.; E. H. Phillips, GLF Soil Building Service, A Division of Cooperative GLF Exchange, Inc.; John Kirk, General Chemical Division, Allied Chemical & Dye Corp.; W. Mercer Rowe, Jr., Flag Sulphur & Chemical Co.; James McConnon, McConnon & Co.; W. J. Lipfert, Woolfolk Chemical Works, Ltd.; Russell Dorman, California Spray-Chemical Corp.; Jack Vernon, Niagara Chemical Division, Food Machinery and Chemical Corp.; Carlos Kampmeier, Rohm & Haas Co.; John Kennedy, Stauffer Chemical Co.; A. F. Kingsbury, Rogers and Hubbard Co., and Roy E. Miller, Miller Products Co.

## O.P.S. General Pesticide Committee

J. Hallan Boyd, Commercial Chemical Co.; B. P. Webster, Chipman Chemical Co.; Jack Vernon, Niagara Chemical Division, Food Machinery and Chemical Corp.; John Rodda, U. S. Industrial Chemicals, Inc.; W. Mercer Rowe, Jr., Flag Sulphur & Chemical Co.; Paul Mayfield, Hercules Powder Co.; W. C. Bennett, Phelps Dodge Refining Corp.; G. F. Leonard, Tobacco By-Products and Chemical Corp., and H. J. Langhorst, American Cyanamid Co.

\* \* \* \*

If manufacturers of DDT are obliged to roll back prices, it will tend to cut production by the diversion of their limited supplies of chlorine to other more profitable uses, members of the Agricultural Pesticides, DDT and BHC Manufacturers

Industry Advisory Committee told OPS officials at their first meeting on July 20.

Committeemen said that supplies of DDT would be tight for the next two years, but that there would be ample BHC for all needs including requirements for export. They also said that, industry was satisfied to continue pricing under the General Ceiling Price Regulation, GCPR. A poll of the committee showed that of 12 companies represented, eight would experience rollbacks and four roll forwards in their DDT ceilings under the provisions of the Manufacturers' General Ceiling Price Regulation, CPR 22. Four companies reported roll forwards and none roll-backs on BHC.

If and when CPR 22 becomes generally effective, dependent on the decision of Congress, the application of CPR 22 to manufacturers of DDT and BHC will still continue to be indefinitely postponed under the provisions of SR 12 to CPR 22.

It was recommended that this postponement be continued at least until October 1, to avoid disturbing the existing price structure in line with the purposes of SR 12. Any reductions which might result from application of CPR 22 before that time would apply retroactively in practice to shipments for the entire season, committeemen said, and might force some smaller firms out of business.

\* \* \*

Committeemen were unwilling to make long-range recommendations for pricing the products of their industry, pending the outcome of the current debate in Congress on extension of price control and its effect on the provisions of CPR 22. It was suggested another committee meeting be called after Congress acts.

\* \* \*

Demand for insecticides from the cotton area is reported to have slowed appreciably. Some mixers and distributors are reported willing now to accept postponement of shipments due them on their contracts, where a month or two ago they were clam-

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oring for supplies. And most producers, incidentally, are quite willing to accept such postponements. It gives them an opportunity to handle some of the heavy load of export inquiries which a few months back they were forced to pass by. If substantial quantities of DDT, BHC, etc., go abroad, this will leave the domestic insecticide industry in a stronger position for next season's business, with no more than normal stocks in the pipelines, all the way down the line from producer to farmer.

There are varying views on the causes behind the slackening in demand. For one thing, the industry's campaign to encourage advance buying last winter and early spring was apparently a success. Warned by the shortages which lasted through the entire 1950 season, most insecticide buyers bought early and heavily this year. They were well stocked before the season opened. And with the cotton crop late, because of the drought in some areas, and excessive rains in others, and with boll weevil not multiplying in some areas as rapidly as had been anticipated, some estimates of the amount of insecticide that would be needed in the cotton belt have been revised downward rather sharply.

Rains during June brought the weevils out of hibernation in many areas and heavy weevil populations occurred in thousands of fields in all states from central Texas to the Atlantic Coast. A new generation of weevils is developing in southern Georgia and in Florida and the other Gulf States. Weevils made their appearance in Virginia and in many counties in North Carolina, Tennessee, Arkansas and in some of the northern and western counties of Oklahoma. Weevil populations are well below last year's level, however.

The pink bollworm situation was probably more serious in Texas during June than in any other June of record. Applications of DDT were the order of the day in many of the Texas fields.

Cavito, a cellulose destroying disease of cotton is quietly making rapid strides throughout the

South and the danger of this disease this year is much greater than ever before. The disease is caused by various cellulolytic bacteria and fungi or their metabolic products or some combination of these factors. Although the exact identity is still open, the damage they do is unmistakable. Cotton fibres are weakened and eventually break, thus producing lint and shorter staple length. Formation of dye spots in vat-dyed fabrics and increased sensitivity to alkali are additional deficiencies produced by the disease.

(Although reports have described Cavito as having done a considerable amount of damage. The U. S. Department of Agriculture is inclined to minimize the situation. Says a spokesman from the Bureau of Plant Industry, Soils and Agricultural Engineering, "... to my knowledge (Cavito) is certainly neither a disease, nor a new condition of cotton fiber. It is merely a condition whereby under certain environmental circumstances there is a breakdown of the fiber cells as a result of microbial action. I have discussed this problem to a limited extent with pathologists of the Cotton Division and in my opinion, the situation is very confused and probably does not deserve too much comment considering our present state of knowledge.")

Raw materials shortages continued to plague producers of agricultural pesticide chemicals. Chlorine remains in short supply and benzene, phenol and related materials also present a continuing problem. Yet, in the face of raw material shortages, DDT production for May, June and July was expected to be high, DDT output for the 1951 calendar year is expected to run about 90-95 million lbs. Technical benzene hexachloride is thought to be produced at the present time at a capacity of well over 100 million lbs. on the basis of 12% gamma material.

Insofar as the European corn borer in the midwest is concerned, the situation for 1951 can be summed up pretty much as follows: "The corn borer picture over the greater part of the infested area is almost uniformly the same—cool evenings, wind and rain have decreased egg laying and first brood infestation appears generally

light." In fact insofar as the first generation corn borer is concerned, no damage of any consequence is expected and hence there will be greatly reduced need for spraying and dusting this season.

Certificates of necessity for accelerated tax amortization have been issued by the Defense Production Authority to seven companies for production of anhydrous ammonia. The firms involved, their locations and the amount of money involved, are as follows:


Commercial Solvents Corp.,	
Sterlington, La.	\$20,458,000
Spencer Chemical Co., Vicksburg, Miss.	\$13,758,000
Matheson Chemical Corp.	
Lake Charles, La.	\$1,388,238
Hooker Electro-chemical Co.,	
Tacoma, Wash.	\$1,894,700
Wyandotte Chemical Corp.,	
Wyandotte, Mich.	\$2,624,000
Diamond Alkali Co., Houston,	
Texas	\$1,606,000
Diamond Alkali Co., Painesville, Ohio	\$828,000

The Food Protection Committee of the National Research Council, Washington, has recently released a statement giving "Basic Considerations Involved in Evaluating Hazards Encountered in the Use of Pesticides on Foods." It is pointed out that two outstanding factors are normally involved: (1) the inherent toxicity of the pesticidal chemicals used (and here chronic toxicity is far more important, for acute toxicity of the substance is rarely involved) and (2) the magnitude of the residue.

Factors that will determine the magnitude of the residue are listed. They include effect of timing of applications, rate of application, rate of loss, dilution due to growth of plants, absorption by plants, etc. Copies of the statement may be obtained from the secretary of the Council, J. L. St. John, 2101 Constitution Ave., Washington, D. C.

Dr. H. L. Haller, assistant chief of the Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, has been named chairman of the Interdepartmental Com-

(Turn to page 86)



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## Technical Briefs

### N Increases Orchard Grass

An area seeded to Finnish late hay orchard grass in the summer of 1947 was laid off in plots with differential nitrogen fertilization treatments with initial applications made in the spring of 1948. A very close correlation was obtained between the rate of nitrogen application and the degree of leafiness and also yield of this strain of orchard grass. At low nitrogen levels few leaves were produced and yields were very low; at medium nitrogen levels (30 pounds of elemental N applied in early spring) more leaves developed and yields were fair; at high nitrogen levels (60 pounds of elemental N) all plants were quite leafy and hay yields were high.

The results of this experiment may explain the poor performance of this strain secured by some other investigators. Where nitrogen levels are low, Finnish late hay orchard grass looks and yields poorly when compared with vigorous early maturing strains. Where nitrogen levels are high, this strain will compare favorably with the early maturing strains in yield of total dry matter and, in addition, will produce a much leafier, better quality forage.

—W. G. Colby in Mass. Exper. Sta. Bulletin 459.

### Mealy Bugs on Grapes

Grape growers in western New York and in the Hudson Valley have encountered a new pest in their vineyards. It is the grape mealy bug, which has not yet assumed serious commercial importance in New York vineyards, but is a nuisance where it does occur, according to Dr. E. F. Taschenberg, vineyard entomologist of the Experiment Station at Geneva.

Chief damage from the mealy bug is caused by a black fungus which grows profusely in the honeydew excreted by these insects. Con-

trol measures are not too well worked out, but preliminary tests indicate that parathion at the rate of one and a half pounds of 15 per cent wettable powder in 100 gallons of water gives good results. Since mealy bugs are difficult to wet with the spray, two to three ounces of wetting agent will increase the efficiency of the spray. It will require at least 200 gallons of spray to the acre. The spray is first applied about a week after the first mealy bugs are found on the foliage and clusters, with a second application ten days to two weeks later.

Mealy bugs overwinter as young nymphs in a cottony-like mass beneath the bark of trunks and canes of the grape vines. As the weather warms up, the insects move to the tender parts of the vines, foliage, and fruit clusters and feed on the plant juices. Late in August the mature insects leave the fruit and foliage and congregate beneath the bark where the cottony masses are made and the eggs laid. The eggs hatch during August and September.

### More Defoliants Predicted

The United States Department of Agriculture recently predicted that there will be wider use of chemical defoliants on cotton this year. The defoliants include calcium cyanamide, sodium chloride with borate, and potassium cyanate. They are applied to mature cotton plants to induce shedding of leaves to permit earlier harvest. The chemicals are usually applied as a dust in the Southeastern states and in a spray in the drier growing areas.

When properly defoliated, cotton gives a higher percentage of clean lint. The treatment also aids in insect control by causing boll weevils to leave the fields when the leaves are gone and reduces weevil carry-over.

According to the Department

of Agriculture, timing is an important factor. For best results defoliants should not be applied until the last bolls expected to make cotton are at least 25 days old. Since cotton in any one field does not mature uniformly, the grower's problem is to time the defoliation for highest yields of good quality lint and seed.

### New Chigger Sprays

Chlordane, lindane, and "Dime" are effective against chiggers in lawns according to a recent report released by Ohio State University, Columbus. The report stated that the mixture should be sprayed at the rate of one gallon per 300 square feet or 145 gallons per acre.

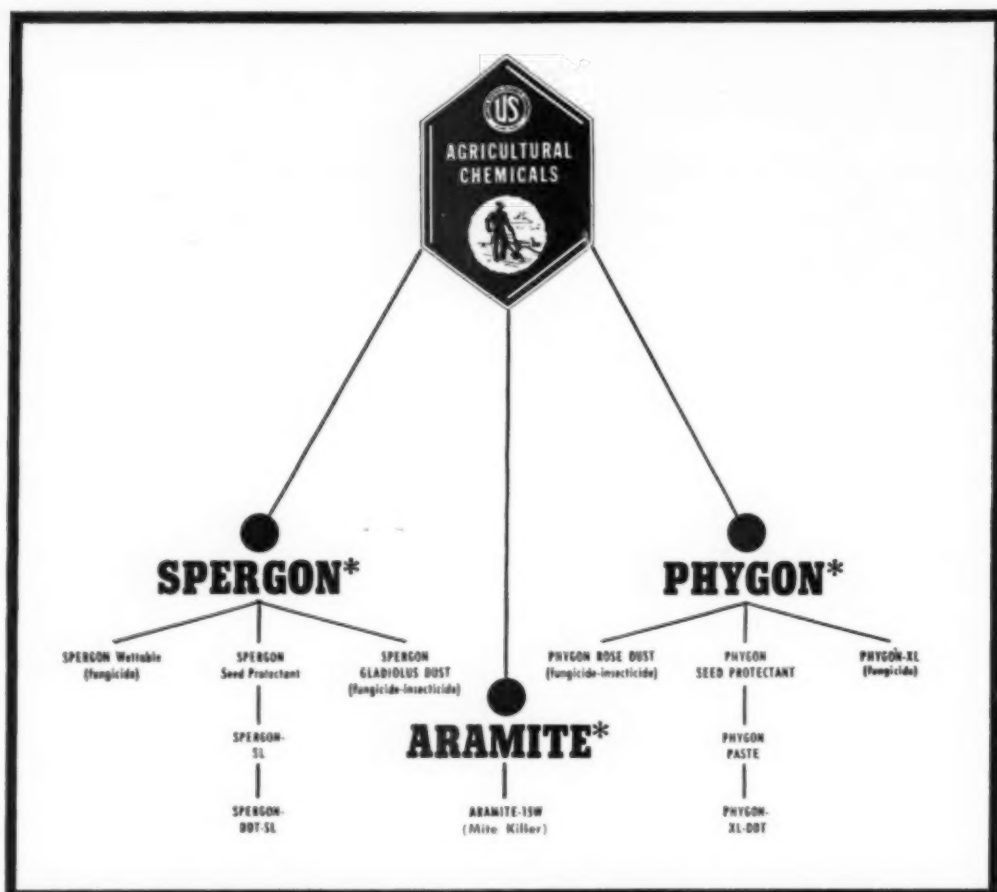
### Toxaphene vs Jap Beetle

In experiments begun in 1947 for the control of adult Japanese beetles (*Popillia japonica* Newm.) and for controlling larvae in the soil, toxaphene appeared to be of little value for destroying an infestation of adult Japanese beetles on peaches at Shiloh, N. J., or in protecting the trees from subsequent infestation.

In laboratory tests toxaphene and DDT were of the same order of toxicity to the third-instar larvae when mixed with 71 representative soils from Connecticut, Massachusetts, New Jersey, New York, North Carolina, Ohio, Rhode Island, and Virginia. The insecticidal action was retarded by organic matter in the soil, but was not affected by applications of the common fertilizers.

Since 1947 equally good results have been obtained with toxaphene and DDT in controlling infestations of larvae in turf in Connecticut and New Jersey, when the toxicants were used at the rate of 25 pounds per acre.

Toxaphene caused no damage to established turf. Preliminary tests with some of the vegetables indicated that the growth of eggplants, peppers, and tomatoes was retarded by an application of 50 pounds of toxaphene per acre. Cucumbers failed to grow in soils containing 25 to 50 pounds per acre.



## The Naugatuck Family Tree Bears Fruit For All

With due modesty, but not without pride, do we of Naugatuck speak of the many benefits made possible by our agricultural chemical products.

To farmers, growers and canners, they have helped to bring better crops, finer produce. To our suppliers and distributors... to the seed processors and all others our products serve, they have contributed a new source of business and profit.

Needless to say, this is a great source of satisfaction to us — and an incentive to discover and manufacture even finer products for the future.

\*Reg. U. S. Pat. Off.

**UNITED STATES RUBBER COMPANY**  
**NAUGATUCK CHEMICAL DIVISION** **NAUGATUCK, CONN.**

Also manufacturers of *insecticides*—Synklor-48-E, Synklor-50-W

In conclusion, the preliminary tests with toxaphene indicate that it is of little value in protecting plants from attack by the adult Japanese beetle, but it may have a place in the control of the larvae in the soil.

—Walter E. Fleming and W. W. Maines, U.S.D.A., in bulletin B-621, July, 1951.

### Quick Fungicide Test

Evaluation of fungicides for control of orchard fruit diseases, such as apple scab, cedar apple rust, cherry leaf spot, and brown rot of sweet cherries, peaches, and prunes or plums, has been speeded up by laboratory and greenhouse techniques.

New materials can be screened for their toxicity to the fungus in question by spraying them on specially coated glass slides by means of a tower sprayer, putting drops of a spore suspension of the fungus on the slides and placing them in a moist chamber for germination. A fair measure of their sticking properties, which are so important in a material, can also be had by swishing the sprayed slides back and forth in a dish of water or letting a spray of water wash them for a period of time before the spores are put on.

The next step is to test the materials on the foliage of greenhouse-grown trees. (If fruit is to be used, it is generally brought in from the field.) To duplicate weather conditions as closely as possible, a chamber in which temperature and moisture can be controlled is used either to study the effect of these factors on the fungus in relation to infection, to provide ideal conditions for infection to take place, or to determine their effect on fungicidal action. This procedure takes into account the relationship between fungus, host plant, and fungicide.

Generally, the foliage, or fruit, is placed on a revolving turntable and sprayed with a high-pressure pump. To determine the retention of the fungicide, the foliage or fruit after drying is again placed on the turntable and given a washing from an overhead nozzle to simulate rain.

After the foliage or fruit is dry, it is inoculated with the spores of the fungus in question and placed in the moist chamber for infection to take place. Should the experiment be to test the effect of fungicides after infection has taken place, the foliage or fruit is inoculated first, given an infection period, and the fungicides then applied.

The technique is not only useful for the rapid determination of the comparative effectiveness of fungicides, as denoted by retention of the material and eradication of the fungus, but it has been especially suitable for measuring (1) the relation of particle size to toxicity and adhesion, (2) the role of diluents and flocculation, (3) the part played by adding insecticides and arsenical correctives, (4) effect of spreaders and stickers upon the quantity and kind of spray residue after different amounts of rainfall, (5) time required for sprays to set and means of hastening it, (6) possibility of spraying in the rain, and (7) redistribution of the fungicide.

Extremely sensitive microchemical methods of analysis have been developed to determine the quantities of fungicide encountered in these studies. A method of printing deposits of many of the fungicides has been perfected for visual examination.

Typical results of this method of attacking the problems of the grower, which are directly applicable to field practice are as follows:

1. Determination of the length of time required for the cedar-rust fungi to become established on foliage and fruit; the period of susceptibility of the apple to the rust fungi; and the relation between growth, number and thoroughness of sprays. A similar study was made on the brown-rot fungus.

2. The specificity of Fermate against the cedar-rust fungi was discovered in an effort to find a fungicide for use with summer oil and nicotine for scab.

3. Most commercially branded materials have been evaluated and classified into two groups, namely,

protectants and eradicants. Factors involved in their mode of action have been studied. The more important of these factors are particle size, formulation, eradication, redistribution, and the effect of temperature and moisture on stability and toxicity.

Briefly, in orchard work, the environment must be accepted without control and the complexity of variables frequently prevents adequate analysis of results. Furthermore, years of experimentation may elapse before conditions suitable for certain phases of the work are encountered. While field trials will always remain the final test of the effectiveness of spray materials, laboratory and greenhouse procedures which reproduce natural conditions most closely not only provide a more rapid and economical method of testing fungicides, but also provide for fundamental research.

—J. M. Hamilton and G. L. Mueh, in *Farm Research*, New York State Agri. Exp. Station Bulletin, Vol. XVII, No. 3, July, 1951.

### Citrus Boron Deficiency

Gumming of the fruit peel, failure of seed development and a hard, dry, undersized fruit are symptoms of boron deficiency in citrus which are fairly well recognized. Leaf symptoms, on the other hand, are not generally recognized. A three-year study of the effect of boron level on tree response of young Valencia orange trees in sand culture showed several distinctive foliage symptoms when boron was limited to very small amounts. The principal symptoms were: (a) Yellowing along mid-rib and lateral veins, accompanied by defoliation when severely affected; (b) veins somewhat swollen on upper surface of leaf with occasional cracking and corking of midrib; (c) leaves thickened and somewhat brittle; (d) buckling of the leaves which throws the internal area of the leaf-blade either upward or downward in relation to the margin; (e) some terminals rosetted as a result of shortened internodal areas of stem; and (f) a dull, lusterless appearance of the foliage.

These symptoms were subsequently observed in several commercial

(Turn to page 87)

# DAVISON



**1. STORAGE CONTROL**—will not cake or lump while in storage.



**2. APPLICATION CONTROL**—drills free and even . . . does not bridge over in the drill.



**3. FOOD CONTROL**—supplies uniform amount of plant food at desirable rates.

Davison's Granulated Superphosphate with 3-way control can mean added sales for you!

No longer is it necessary for you or the farmer to worry about lumping or caking . . . Davison's Granulated Superphosphate will store without becoming hard or caked. And when the farmer starts to apply Granulated Superphosphate in the field he will find there is no dusting nor will it bridge over in the drill. Granulated Superphosphate drills freely and evenly giving complete coverage. Because of the granular structure, plant food is released at desirable rates.

For added sales points be sure to get *Davison's Granulated Superphosphate with the 3-way control!*

*Progress Through Chemistry*

**THE DAVISON CHEMICAL CORPORATION**



Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLOURIDES AND FERTILIZERS.

**AGRICULTURAL CHEMICALS**

## BRANNAN

(Continued from Page 23)

of assuring needed farm production would not be a major industrial effort. The requirements for building an additional 500 thousand tons of nitrogen capacity are only about 100 thousand tons of steel, or about one-thousandth of our annual steel production.

We hope and believe that private industry including farm cooperatives will be able to provide this needed increase in production. The Government is providing tax amortizations and loans under the Defense Production Act to help private industry finance new plant capacity. And it is giving priorities assistance to help private industry obtain controlled materials with which to construct this new capacity.

### Private Industry Gets Nod

IT is conceivable that in an extreme emergency, additional plant capacity could be built by the Government as was done in World War II. You will recall that the Government built ten nitrogen fixation plants at that time and sold eight of them to private industry at less than cost after the war. It is my understanding that those plants are producing about half of the total nitrogen output at this time. However, it goes without saying that the Government prefers that private industry carry the ball. The Department will give what help it can to private industry in getting the job done. One of our major efforts is to get back into production the Army's nitrogen plant at Morgantown, West Virginia.\* This is one of the two plants retained by the Army following World War II. The other plant is being used in connection with research on liquid fuels.

The Morgantown plant could give us an additional 100 thousand tons per year as soon as it is put in

\*Mobilization Director Charles E. Wilson has since informed Secretary Brannan that "We are trying to help you get the Morgantown Ordnance Ammonia plant into operation and are carefully considering inducements to secure a large nitrogen expansion program." It was indicated that four or five months would be required to get the plant operating at full capacity.

operation. Another plant of 35 thousand tons capacity in Mississippi might also be brought into operation without much difficulty. The production of these plants probably would be about as close as we could expect to get to the 500 thousand tons needed for 1952.

The second part of our program is to work for additional production of nitrogen fertilizer amounting to 100 thousand tons each year, following the increase of 500 thousand tons. This extra production to be added each year is necessary to meet the increasing demands of our growing population. We are growing at the rate of a little more than two million persons a year, or about six thousand every day.

These objectives for increasing nitrogen production are largely short-range objectives. But they are also compatible with the long-range needs of agriculture for increased fertilizer supplies.

### Heavy Demand Ahead

IF you were to take the rate of increase in fertilizer consumption during the past 50 years and project it into the future you would find that the need for nitrogen in 1960 would be about double that of today. This fact and others indicate that the short-range objectives for increasing nitrogen production are not likely to result in future oversupply. To the contrary, the very limitations now facing agriculture would indicate that the business of producing nitrogen will be a booming one for years to come.

By 1953, we should remember, there will be an additional four million people in our midst. So that by that date there will be a need for a total of 700 thousand tons additional nitrogen capacity.

I already have mentioned the third part of our program, which is to work for more efficient and more economical use of sulfur and phosphates.

We also are working with research people and several American chemical companies on the possibility of substituting citric acid for sulfuric

acid in the treatment of phosphate rock. We are encouraging the production of higher analysis fertilizer materials to reduce handling and transportation charges. Equally important, we are working for wider adaptation of better farming practices and techniques with respect to fertilizer which will do most to increase production.

We are giving special attention to our grasslands program, encouraging the use of fertilizer in building more productive hay and pasture lands. For as I have pointed out, grasslands present the greatest potential for increasing production of all our croplands. These are the highlights of our fertilizer program. They outline the major actions we are taking to bring about the needed increase in fertilizer production.

As I mentioned earlier, however the Department's overall program for helping agriculture fill its role in the mobilization program is a broad one. I pointed out that it involves organizing agricultural production for defense needs and working for better farming methods, adequate materials and facilities, sufficient manpower, and reasonable price assurance. I can assure you that the Department will carry out its responsibilities aggressively, and yet in a spirit of full cooperation with other agencies and with industry.

Meanwhile it is my hope that the splendid cooperation which has existed between the plant food industry and the Department of Agriculture will continue to serve the nation in this time of emergency.

I believe that the cooperation we have enjoyed in recent years can be used as a good example of how progress made through cooperation of the Government and private enterprise has created a dynamic trend in agriculture on which the nation will capitalize for years to come.

There can be no doubt that the health and wealth of the United States have been aided materially by the plant food industry in the past. There can be no doubt that it will contribute heavily to national security in the critical years ahead.★★

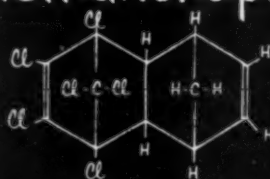


To a chemist

# aldrin

is

hexachlorohexahydro-  
dimethanonaphthalene



But to the  
**BOLL WEEVIL**  
and his gang

it's **Murder!**



Your formulations require less chemical content when you use aldrin . . . a decided economy. And your customers are *demanding* aldrin's amazing control . . . a demand that indicates prompt action to supply it.

# aldrin



**SHELL CHEMICAL CORPORATION**

Aldrin is manufactured by Julius Hyman & Co., and is distributed by Shell Chemical Corporation, 500 Fifth Avenue, New York 18. Aldrin is available under the brand names of leading insecticide manufacturers.

**AGRICULTURAL CHEMICALS**

# INDUSTRY NEWS

## Nat'l. Shade Tree Meeting

The National Shade Tree Conference will hold its 27th annual convention at the Netherland Plaza Hotel, Cincinnati, Ohio, August 27-31. Included on the program for August 29 is a paper, "Foliar Application of Nutrients" by P. P. Picone, Brooklyn Botanical Garden, New York, and that evening the National Arborist Association, holding a meeting in connection with that of the Shade Tree Conference, will hold its annual banquet.

On August 30, the afternoon session will include "How I Operate a Small Tree and Landscape Business" by F. L. Parr, Parr & Hanson, Hicksville, N. Y.; and "Some Shade Tree Pests in the Midwest and Their Control," by Dr. R. B. Neiswander, entomologist, Ohio Agricultural Experiment Station, Wooster. A plant clinic is also scheduled to be held on that afternoon, with the annual banquet in the evening.

The final day, August 31, will be under the chairmanship of Noel B. Wysong, vice-president of the N.S.T.C. Among the papers to be presented there is one entitled, "Factors Involved in Injury by Mist Blower DDT Formulations," by Dr. John G. Matthysse and Dan Clower, Dept. of Entomology, Cornell University, Ithaca, N. Y.

A number of tours to points of interest to tree men in Cincinnati and its surroundings, have been planned by the group.

## Haeussler Heads USDA Div.

Gilbert J. Haeussler has been named leader of the Division of Truck Crop and Garden Insect Investigations by Avery B. Hoyt, chief of the Bureau of Entomology and Plant Quarantine, the U. S. Department of Agriculture announced last month. William H. White, former leader of this Division, died March 14, 1951.

Mr. Haeussler entered federal service in 1925 in the then Bureau of Entomology. He was engaged for



G. J. HAEUSSLER

16 years in research on the control of insect pests of fruits by means of their natural enemies. From 1929 to 1934 he traveled in France, Italy, and Japan, searching for and shipping to this country, parasites that attack the oriental fruit moth, an important pest of peaches. From 1934 until 1940 he was stationed at the Bureau's Moorestown, N. J. laboratory investigating both native and foreign parasites of this insect pest.

In 1940 he was appointed field leader of the then new Comstock mealybug control project, with headquarters at Charlottesville, Va. This insect then threatened apple production in parts of Virginia, West Virginia, and Ohio. Parasites, introduced from Japan, were reared in large numbers by the Bureau in the laboratory at Charlottesville and liberated by Mr. Haeussler. These natural enemies proved extremely effective in the control of the pest within only a few years and the Comstock mealybug is of only minor importance in the area now.

In 1941, Mr. Haeussler was pointed assistant leader of the Division of Fruit Insect Investigations, with headquarters in Washington,

D.C. He has been leader of the Bureau's Division of Insect Survey and Information since August, 1944.

Mr. Haeussler is well known to readers of *Agricultural Chemicals* as a regular contributor to "The Listening Post." He has been reporting the insect situation for this publication since the first issue in May, 1946. The column will now be conducted by Kelvin Dorward who replaces Mr. Haeussler in his USDA post also. (See page 49).

## New Bag Plant in Canada

St. Regis Paper Co., Ltd., of Canada plans to start construction of a multiwall bag plant at Dryden, Ontario as soon as possible, according to an announcement by Thomas H. Cosford, vice-president and managing director. The new plant will be a one-story structure covering approximately 73,000 square feet with the latest equipment, according to the announcement. J. M. Harnit, vice-president in charge of multiwall paper bag manufacturing, will be in charge of the construction and will supervise subsequent manufacturing operations.

## Donald Upped by Lion Oil

Leroy Donald has been made sales manager for the Chemical Division of Lion Oil Co., according to an announcement by A. Frank Reed, vice-president in charge of sales. Mr. Donald joined Lion in June, 1948, as chief agronomist and has been Mr. Reed's administrative assistant since 1949.

Lion has also announced that R. W. Goldthwaite had been named an assistant sales manager of the chemical division. He came with the company in 1947 and has been sales manager of the western division since early in 1951. George C. Cook, manager of the sales analyst department will assume the duties formerly performed by Mr. Donald.

## Summer Tour Planned

The Ohio State University and Pennsylvania State College staff members have arranged a tour of their respective states for members of the NFA Plant Food Research Committee and for all interested college and industry agronomists and representatives. This tour to be held prior to the meeting of the American Society of Agronomy and Soil Science Society at State College, Pennsylvania, will start at Columbus, Ohio at 8:30 A.M., Thursday, August 23rd and end Saturday afternoon, August 25 at Slippery Rock, Pennsylvania.

The itinerary and information on possible lodging accommodations and points of interest, are as follows:

Wednesday, August 22, the group will spend the night at Columbus, Ohio. The Fort Hayes, Deshler-Wallick, Neil House, Chittenden, or Southern hotels will be used.

Thursday, August 23, 1951 - 8:30 a.m., (E.S.T.) Meet at Townsend Hall, Ohio State University, to spend forenoon visiting extension demonstration tests under direction of Professor E. P. Reed in vicinity of Columbus.

1:30 p.m., - Visit Ohio Seed Co. Producers Research Farm, Croton, Ohio under direction of J. E. Van Fossen, Manager. Points of interest will be seed corn processing and storage, corn and soybean variety test, fertility program, and grass and legume observation plots. The night will be spent at Mansfield, Ohio - Mansfield-Leland, Fairview, or Southern hotels.

Friday, August 24, 1951 - 9:00 a.m., Visit Malabar Farm, Lucas, Ohio as guest of Louis Broomfield. This is an opportunity to meet Mr. Broomfield and study his program of food production and soil conservation through the use of well fertilized grasslands. 1:30 p.m., - Meet at Thorne Hall, Ohio Agricultural Experiment Station, Wooster, Ohio. Inspect research at Ohio Agricultural Experiment Station including fertilization, methods of seeding

and pasture research. That night, Wooster, Ohio.

Saturday, August 25, 1951 - 8:00 a.m., Leave Wooster for Slippery Rock, Pennsylvania, travelling through the industrial and agricultural area of North Eastern Ohio, with lunch at Slippery Rock State Teachers College, Slippery Rock, Pennsylvania.

## MEETINGS

Annual Meeting to Consider Fertilizer Grades. Buccaneer Hotel. Galveston, Texas. July 19 & 20.

American Society of Agronomy. State College, Pa., August 27-31.

27th Annual Convention. National Shade Tree Conference. Netherland Plaza Hotel. Cincinnati, Ohio. Aug. 27-31.

Diamond Jubilee Meeting. American Chemical Society. New York City. September 3-7.

National Agricultural Chemicals Association. Essex and Sussex Hotel. Spring Lake, N. J. September 5-7.

American Society for Horticultural Science. Minneapolis. Minn. September 10-12.

National Joint Committee on Fertilizer Application, held jointly with American Society for Horticultural Science. University of Minnesota. St. Paul. September 10, 1951.

12th International Congress of Pure and Applied Chemistry. New York City. September 10-13, 1951.

Annual Fertilizer Conference. Rutgers University. New Brunswick, N. J. September 27, 1951.

California Fertilizer Association. Hotel Californian. Fresno, Calif. November 1-3.

13th Annual New York State Insecticide and Fungicide Conference, and third annual Pesticide Application Equipment Conference. Ithaca, N. Y., Nov. 7-9.

Cotton Mechanization Conference. Cotton Branch Experiment Station. Chickasha, Oklahoma. Nov. 8 & 9.

National Fertilizer Association Fall Meeting. Atlanta Biltmore Hotel. Atlanta, Ga., November 12-14.

Eastern Branch, AAEE. New Yorker Hotel. New York. Nov. 15 & 16.

Combined meetings of American Association of Economic Entomologists; Entomological Society of America; American Phytopathological Society; and the Potato Association. Netherland Plaza Hotel. Cincinnati, Ohio, December 8-13.

Northeastern States Weed Control Conference. New Yorker Hotel. New York City. Jan. 2, 3 & 4, 1952.

11th Annual Meeting. Northwest Vegetable Insect Conference. Imperial Hotel. Portland, Oregon. January 21-23, 1952 (David H. Brannon. Pullman. Washington. Secty.)

## N Committee Named

The National Production Authority, U. S. Department of Commerce, has announced the membership list of the Nitrogen Industry Advisory Committee as follows:

F. T. Techter, vice-president, Barrett Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York, New York; Albert B. Baker, Bradley & Baker, 155 East 44th Street, New York 17, New York; A. B. Huyck, vice-president, Brooklyn Union Gas Company, 176 Remson Street, Brooklyn 2, New York; T. J. Carpenter, vice-president, De Bordeleben Coal Corporation, By Products Division, Holt, Alabama; E. F. Schumaker, director of sales, Polychemical Department, E. I. du Pont de Nemours & Company, Wilmington 98, Delaware; A. F. Reed, vice-president, Lion Oil Company, Chemical Division, El Dorado, Arkansas; J. C. Leppart, Exec. vice president, Mathieson Chemical Corporation, Baltimore, Maryland.

G. W. McCullough, Exec. vice-president, Phillips Chemical Company, Bartlesville, Oklahoma; Richard F. Hopkins, president, San Jacinto Chemical Corporation, Houston 15, Texas; L. V. Steck, vice-president, Shell Chemical Company, 50 West 50th Street, New York, New York; John R. Riley, vice-president, Spencer Chemical Company, Dwight Building, Kansas City, Missouri; and Walter Titlow, Mgr., Coke and Chemical Sales, Allan Wood Steel Company, Conshohocken, Pennsylvania.

## Spencer Advances Schramm

Spencer Chemical Company, Kansas City, Mo., has announced the appointment of Robert W. Schramm as manager of its market research section. Mr. Schramm will report to G. V. Taylor, director, sales development department.

Mr. Schramm joined Spencer Chemical Company in January, 1949, as a market analyst and was later advanced to market analyst in charge of industrial chemicals. Prior to this, he was connected with Carbide and Carbon Chemical Corp.

## AGRICULTURAL CHEMICALS

### Calif. Fertilizer Assn. Meets

Program details are being worked out for the annual convention of the California Fertilizer Association scheduled to be held November 1-3 at the Hotel Californian, Fresno. However, according to Sidney H. Bierly, executive secretary and manager of the Association, the program will feature authorities on the supply situation, allocations and governmental regulations. Further details are expected to be ready for our September issue.

### Putnam to Mich. Chem.

Michigan Chemical Corp., Saint Louis, Mich., has announced the addition of Sherman W. Putnam to its sales staff. Mr. Putnam was formerly assistant general sales manager of Dow Chemical Co., Midland, Mich. He will be in charge of commercial development work for Mich. Chemical, and will handle "other special assignments in our expansion program," according to Roland P. Place, M.C.C. president. Mr. Putnam had been with Dow for the past 27 years.

### Poulsen to New L.A. Site

A. E. Poulsen & Co. calls to our attention that it is located in Los Angeles, California rather than at San Francisco, as mentioned in the article about F. G. Morales, Havana, Cuba, in the July issue. However, the company is moving to larger quarters soon, but it will continue to be in Los Angeles. The new address is 3306 E. Slauson Ave., Los Angeles. We are sorry that this error occurred in our story.

### Arnold, V.-C. Retires

After forty-seven years of active work in the insecticide industry, forty years of it with a single company, Robert B. Arnold retired on July 1, 1951, from his position as director of the research department of Virginia-Carolina Chemical Corp., Richmond. He is best known to the industry as "In charge of Research" for Tobacco By-Products and Chemical Corp.

His career is unique in that he combined in one person wide chemical and entomological knowledge with



ROBERT A. ARNOLD

long experience in production and applied this composite knowledge to the solution of biological problems.

Early in his career he originated a process of extracting nicotine from tobacco material, which led to

"Black Leaf 40" becoming the standard nicotine insecticide of the world.

Although his professional interests were as wide as the pesticide industry, most of his field studies were devoted to extending the use of nicotine. He had notable success in this endeavor and his performance in this field may be taken as a model of how Industry and Government Agencies can work together to mutual advantage.

Mr. Arnold states that his most most prized possession is the memory of participating in many industry and entomological society meetings and the many personal friendships he made in the industry.

### Gaugler Elected V-P

Raymond C. Gaugler, president of American Cyanamid Co., New York, was recently elected vice-president of the Manufacturing Chemists Association to succeed Leonard T. Beal, retired.

## Fertilizer Safety Program Announced

FERTILIZER manufacturers the country over are urged to come themselves or to send representatives to the October 11th meeting of the Fertilizer Sub-Section of the National Safety Council to be held at the Stevens Hotel, Chicago. This portion of the program is scheduled to be held in meeting room No. 9 in the Stevens on the afternoon of October 11.

The program will include the presentation of papers, a symposium, the showing of a sound film on fertilizer safety and election of officers to head the sub-section.

A. B. Pettit, supervisor of industrial health and safety of the Davison Chemical Corp., Baltimore, will be general chairman of the meeting and as such will describe the organization and objectives of the fertilizer section.

The symposium, "Achieving Safety in Fertilizer Plants," will be led by J. M. Sisson, safety officer of the TVA, Wilson Dam, Ala. Other speakers on the panel and their as-

signed subjects are: "Handling of Sulfuric Acid," David P. Delavan, chemical superintendent, Pasadena Fertilizer Plant, Mathieson Chemical Corporation, Pasadena, Texas; "Handling Anhydrous Ammonia and Ammonia Solutions," H. R. Krueger, director technical service, Phillips Chemical Company, Bartlesville, Oklahoma; "Handling Bulk Storage," (construction and removal of bulkheads, storage and handling of explosives and elimination of slides) - U. C. Ellis, general superintendent, Plant Food Division, Swift & Co., Chicago, Illinois; "Operation of Mobile Equipment" - C. E. Killebrew, sales manager, The Frank G. Hough Company, Libertyville, Illinois; "The Importance of Good Housekeeping in Lowering Costs" - M. F. Wharton, Secretary-Treasurer, Arizona Fertilizers, Inc., Phoenix, Arizona.

Persons intending to be at the conference are urged to make their hotel reservations as soon as possible, Mr. Pettit states.

### Richfield Grant Made

Richfield Oil Corp., Los Angeles, has made a grant to the Nevada State Department of Agriculture to further the joint program carried out by Richfield and the State of Nevada on control of the Halogeton weed, recognized as a threat to the sheep and livestock industry in the west.

Objectives of the program to be carried out by the State Department of Agriculture in cooperation with the Agricultural Experiment Station and the Fish and Wildlife Commission will be threefold.

1. To determine the effect of Halogeton on livestock and wildlife.
2. To determine, if possible, the prevention and cure of Halogeton poisoning.
3. To study the ecology of Halogeton.

The Richfield grant was made through the company's president, Charles S. Jones.

### Detgen to Post for Naco

John R. Detgen has been named manager of the Naco Fertilizer Company plant in Findlay, Ohio, it has been announced by Kenneth D. Morrison, president.

Prior to his appointment to the Findlay post Mr. Detgen was assistant to the president of Naco. Previously he had been associated with the Burroughs Adding Machine Company, the Terminex Co. of North Carolina, and served as president of the J. R. Detgen Co. of Fayetteville, N. C. where he has resided during the past five years.

### To Sell German Products

General Industrial Development Corporation, 270 Park Avenue, New York 17, N. Y., has been appointed exclusive agent in the United States and Canada for Bamag-Megu, A.G., German manufacturers and designers of industrial process equipment.

Bamag-Megu, with plants at Berlin, Giessen, Butzbach and Cologne, has been manufacturing process equipment for more than 80 years. Its products now will be available to manufacturers in the U. S.

and Canada through G. I. D. Corp. For the time being, activities will be concentrated on equipment for manufacturing fertilizers, acids, nitrogen, hydrogen, and other gases. Emphasis also will be given to gas generating and converting, ammonia processing, coal and coke treatment, sulfur recovery and the distillation and refining of oils and fats.

### New Pyrophyllite Firm

As of August 1st, the Glendon Pyrophyllite Company has been operating the pyrophyllite properties at Glendon, North Carolina. These mines and plant for the past seven years have been operated by the Carolina Pyrophyllite Company. E. L. Phillips will be the sales engineer for the new company, which will be associated with the Carolina Pyrophyllite Company. Offices of the company will be located at 10 East 40th Street, New York 18, New York.

### Lion Appoints Smith

Ben S. Smith, Jr., has been named director of Industrial Relations for Lion Oil Company, the firm has announced. He replaces John W. B. Foringer, resigned. Mr. Smith became associated with Lion Oil in April, 1937.

### H. L. Shelley Retires

Howard L. Shelley, a salesman in the coal chemicals division of Bethlehem Steel Co., Bethlehem, Pa., has retired, it was announced by Erb Gurney, manager of sales. Mr. Shelley, who was associated with Bethlehem for 45 years, served in sales handling coal products and in recent years has specialized in the sale of sulphate of ammonia.

### Violators Prosecuted

The Arkansas State Plant Board recently announced that it awarded a citizen of the state \$100 for information leading to the arrest and conviction of a termite control operator who violated the Board's regulations. The accused operator allegedly operated without a license

from the Plant Board and used motor oil in treatment for termites. According to O. H. Curry, secretary-treasurer of the Board, the organization is doing its best to eliminate "phony" termite control operators.

### N. J. Fertilizer Conference

The annual New Jersey State fertilizer conference will be held September 27 at Rutgers University, New Brunswick, N. J., according to Stacy B. Randle, N. J. State Chemist. The program had not been announced at press time, but it was expected to be mailed soon.

### Safety Program Pays Off

A check for more than \$33,000 was presented recently to Chester F. Mockley, chairman and president of The Davison Chemical Corporation, by William Harper, president of the Maryland Casualty Company, representing return premium earned by Davison in the twelve months to October 8, 1950 under the company's workman's compensation insurance coverage.

Mr. Harper said that the return premium in percentage was one of the largest ever made by his company, reflecting the unusual safety record made by Davison plants at Curtis Bay, Baltimore; Bartow, Florida; Nashville, Tennessee; Perry, Iowa; New Albany, Indiana; New Orleans, Louisiana, and Savannah, Georgia.

### German K<sub>2</sub>O Exports Up

Steadily-increasing world demand for West-German potash will make exports of that commodity "considerably larger" between July 1, 1951 and June 30, 1952, representatives of the Potash Sales Office at Hanover have predicted.

Export contracts for delivery in 1951-52 either concluded or under negotiation late in July, amounted to 450,000 tons of K<sub>2</sub>O as compared with shipments abroad of 341,684 tons during the calendar year of 1950. Largest importers of German potash are the U. S. and Canada, together accounting for 121,000 tons so far as compared to 42,400 tons in 1950.



### N. Central Weed Meeting

Announcement of the 8th annual meeting of the North Central Weed Control Conference has been made by Larry Robinson, chairman. The three-day meeting will begin Tuesday, December 11 and continue through the 13th, at the Municipal Auditorium, Oklahoma City, Okla.

Program plans have not yet been completed, but details are being worked out. Inquiries regarding the program or exhibit space should be addressed to Larry Robinson, 122 State Capital Bldg., Oklahoma City 5, Okla. Further details covering the program itself will be carried in subsequent issues of *Agricultural Chemicals*.

### NFA Booklet, Letterheads

A new booklet, "Fertilizer Use at the Half-Century Mark" has been issued by the National Fertilizer Association, Washington, D. C. The book, printed in two colors, is based on results of the recent U. S. Department of Agriculture survey showing application of fertilizers by both crops and regions of the U. S. The U.S.D.A. figures, gathered in 1947, were extended to 1950 by John F. Gale, NFA economist and Dr. M. H. McVickar, chief agronomist.

The NFA has also announced the availability of four-color letterheads intended to promote the national grassland program. The NFA has ordered a million copies of the letterheads, samples of which have been sent to the fertilizer trade and other farm organizations. Individual letterheads may be imprinted on the multi-colored sheet which depicts six steps toward more profitable grassland practices.

### Moore Joins Velsicol

H. Moore has joined Velsicol Corporation as a field entomologist, with headquarters in the Southern States, the company has announced. He will work with Federal and State experiment stations in connection with research being conducted with Velsicol insecticidal products.



H. MOORE

Mr. Moore, a graduate of Clemson College and of Texas A&M College, has been associated with the New Mexico Extension Service as extension entomologist. Before his work in New Mexico, he was associated with So. Carolina Extension Service as assistant entomologist in cotton insect control.

### Liquid N Demand up in Ill.

The Illinois Anhydrous Ammonia Co., Farmer City, Ill., plans to double its storage facilities next season despite the fact that its new plant, opened only recently, can store 100,000 gallons. Plant manager Lloyd Lent states that the company expects to apply liquid nitrogen fertilizer to some 16,000 acres in Illinois, but the demand indicates the need for more capacity.

According to the manager, 14,000 acres of corn will be fertilized, 50 percent of it prior to planting and the rest during cultivation. Other crops listed for application are a thousand acres of wheat, 250 acres of oats, 150 of soybeans and 50 acres each of asparagus, clover, tomatoes and grass-crops as well as 500 acres of sweet corn.

Anhydrous ammonia is supplied to the firm by Phillips Chemical Co., Bartlesville, Okla.

### 3 Bid or Plant Operation

Three bids have been received for operation of the Government's

anhydrous ammonia plant at Morgantown, W. Va. The bids came from Mathieson Chemical Corp., Baltimore, Allied Chemical and Dye Corp., New York, and the United Distillers of America.

### Super. Price Rise Asked

In its meeting of July 25, the Superphosphate Industry Advisory Committee told OPS officials that there will necessarily be a substantial cut in superphosphate production unless prices can be advanced. It was also indicated that demand for sulfuric acid is so heavy that unless superphosphate prices are increased, sulfuric acid will tend to find its way into other more profitable uses.

### Curl Leaves Comm. Solvs.

Daniel Curl, Jr., formerly general manager of the agricultural chemicals division of Commercial Solvents Corporation, has left the company, it was announced late in July. At press time, no one had been named to replace Mr. Curl, nor had he announced his plans for the future.

Before joining C.S.C., Mr. Curl was general manager of Rumford Chemical Co., Rumford, R. I.

### Giles, Mich Chem V-P

John L. Giles has been appointed executive vice-president and general manager of the Michigan Chemical Corporation, Saint Louis, Mich., the company has announced. Mr. Giles succeeds Charles Gerlach who resigned recently. Leonard Gopp continues as manager of the corporation's insecticide division.

### Feed Assn. Plans Meeting

September 18 and 19 are the dates set for the annual convention of the National Mineral Feeds Association, Inc., according to Peter W. Janss, Des Moines, Iowa, executive secretary of the group. The convention will be held at the Bismarck Hotel, Chicago, Mr. Janss says.

### N.J.C.F.A. Program Out

Program details for the 27th annual meeting of the National Joint Committee on Fertilizer Application held jointly with the American Society for Horticultural Science, have been announced by the committee. The meeting is scheduled to be held at the University of Minnesota, St. Paul, on September 10. The 9:30 morning session is planned as follows:

"New Concepts and Recent Practices in the Use and Application of Fertilizer to Deciduous and Small Fruits," Committee report, A. L. Kenworthy and committee.

"Future of Leaf Analysis as a Diagnostic Tool for Determination of Fertilizer Requirements of Fruit Crops," W. P. Judkins, Virginia; panel chairman. Other members of the panel are, A. F. Camp, Florida; M. E. McCollam, California; A. L. Kenworthy, Michigan; G. F. Potter, Louisiana; O. Lilleland, California; N. J. Shaulis, New York and E. K. Walrath, Massachusetts.

"Use of Fertilizer Solution in Leaf Feeding," N. F. Childers, New Jersey, panel chairman. Others on symposium are: Damon Boynton, New York; T. A. Merrill, Washington; A. F. Camp, Florida; E. R. Parker, California; L. L. Danielson, Virginia; and S. H. Wittwer, Michigan.

"Recent Fertilizer Machinery Developments Particularly for Horticultural Crops" will be reported by G. A. Cumings, U.S.D.A.

The afternoon session, to begin at 1:30, will include the following:

"The importance of Some Easily Measurable Factors of Soil Fertility and Land Management in the Production of Sweet Corn," by G. R. Muhr, Green Giant Company, Le Sueur, Minn. "New Concepts and Recent Practices in the Use and Application of Fertilizer to Vegetable Crops," a committee report, with Dr. J. B. Hester in charge. Members of the panel include M. T. Vittum, New York; E. R. Purvis, New Jersey; M. L. Odland, Pennsylvania; E. P. Brasher, Delaware; and V. A. Tiedjens, Virginia.

### New Warfarin Booklet

S. B. Penick & Co., New York, has issued a 34 page booklet which describes their experiences with warfarin. Entitled *A Year's Experience with Dethmor (Warfarin) for Rat*

and Mouse Control, the booklet contains a history of the compound, some of the experiments conducted with the material and letters and articles that describe the material in considerable detail.

## New Books, Bulletins Available

*Pruning Bearing Apple Trees*, by Arthur J. Farley, Norman F. Childers, and Ernest G. Crist, pomologists, Extension Service, College of Agriculture, Rutgers University, New Brunswick, N. J. Extension bulletin 258, issued May, 1951, 8 pages.

*Vegetable Insects and Their Control on Commercial Plantings*, by Ordway Starnes and John P. Reed, New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick. Bulletin 756, issued April 1951, 16 pages.

*Report on Inspection of Commercial Feeding Stuffs, 1950*, by H. J. Fisher, chief chemist, Connecticut Agricultural Experiment Station, New Haven. Bulletin 547, issued March, 1951, 138 pages.

*Control of the Pea Aphid in the East*, prepared by J. E. Dudley, Jr. and T. E. Bronson, Division of Truck Crops and Garden Insect Investigations, United States Department of Agriculture. Pamphlet EC-16, issued July, 1951, 10 page folded pamphlet. *Screw-worm Survey in the Western United States, 1950*, by E. W. Laake, Division of Insects Affecting Man and Animals, United States Department of Agriculture. Special Supplement (1951, No. 6) of Insect Pest Survey, issued July 5, 1951, 7 pages.

*The More Important Insect Records for June 1951*, compiled by the Agricultural Research Division, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture as part of the Insect Pest Survey on cereal and forage crop insects, issued July 9, 1951.

*Alkali Soils* by W. P. Kelley. Published by Reinhold Publishing Corp. New York. 176 pages, 6 x 9 inches, cloth binding, price \$5.00.

A general discussion of the basic principles involved in the accumulation of salts in soils, the effects of these salt in the soil, and other factors concerning alkali soils are contained in this text. Other considerations include irrigation in relation to alkali soils, alkali soils in relation to plant growth, and the reclamation of alkali soils. The text is intended primarily for research workers, teachers and students of soils and agronomy. The book is not intended as a manual of alkali soil classification, but the author points out that an understanding of the principles will certainly contribute to a rational system of classification.

*Chemical Analysis of Foods and Food Products*, by Morris B. Jacobs, senior chemist in the New York City Department of Health; published by D. Van Nostrand Co., 902 pages, illustrated, cloth binding, price \$9.00.

The book covers analytical methods of food chemists in determining purity of various foods such as detection of improperly pasteurized milk, chemical assay of vitamins, and homogenization of milk. The book is technical, giving various methods of testing foods for the presence of coloring matter, preservatives, and metal.

### CSC Issues Booklet

Commercial Solvents Corp., New York has issued a 25 page booklet which describes the use of riboflavin as an ingredient in livestock feeding. Entitled *Riboflavin for Poultry and Livestock*, the booklet contains information on the role of riboflavin in nutrition and describes sources of the chemical as well as deficiency symptoms.

### **Veg. Growers Meet in NY**

Two New York state farm organizations were to hold summer meetings on the grounds of the Experiment Station at Geneva in August. The New York State Vegetable Growers Association field day was planned for Saturday, August 11th, and the New York State Horticultural Society was to meet at the Station on Wednesday, August 15th.

Progress in research with fruits and vegetables is the theme of both gatherings. The program called for a visit to experimental work under way in fields and laboratories and also for a number of demonstrations and exhibits.

Of special interest to vegetable growers was a scheduled demonstration of seed-corn maggot control with seed treatment; disease and insect control with vegetable crops; rotation and fertilizer trials; and weed control in vegetables; to mention a few of the high lights planned for the field day.

Of particular interest to fruit growers, the program includes testing of new insecticides for major fruit pests, such as codling moth, plum curculio, peach tree borer, oriental fruit moth, and other insects; the evaluation of fungicides for apple scab and brown rot of peaches; and the large collection of varieties and selections of fruits under trial on the Station grounds.

### **Red Squill to Flood Area**

S. B. Penick & Co., New York, recently rushed a quantity of red squill to Kansas City at the request of the American Red Cross and United States Public Health Service. These organizations report that as an afterthought of the recent floods in the Kansas City area, a large emergence of rats has been affected as the waters receded, and that control of the rodents was urgent.

### **S-W Shifts Export Div.**

Sherwin-Williams Co. has announced that its export sales of agricultural chemicals will be handled through the offices of its Pigments,

Colors and Chemical Division, 100 Park Ave., New York 17, N.Y. The change was made to consolidate all raw material and chemical production and distribution under one administration, the company states.

### **Heads Agri. Department**

L. N. West, executive vice-president of Wilson & Geo. Meyer



**RALPH S. WALTZ**

& Co., San Francisco, Pacific Coast distributors of agricultural and industrial chemicals, has announced the appointment of Ralph S. Waltz as manager of the firm's agricultural department. Mr. Waltz succeeds George P. Bloxham, recently resigned. In his new position, Mr. Waltz will direct the sales of fertilizer products distributed by the firm, such as American Potash & Chemical Corp. potash, Stauffer Chemical Co. superphosphates and Norsk Hydro calcium nitrate, the latter product imported from Norway.

Mr. Waltz joined the Meyer firm in 1945 leaving the Navy. He is a graduate of the University of California and was associated with the University's Agricultural Extension Service prior to the war.

### **DDT Producers Meet**

At a recent meeting of the DDT Industrial Advisory Committee, members of the National Production Authority stated that about 105,000,000 pounds of DDT will be required for the twelve month period beginning October 1. Members of

the DDT committee stated that they have the facilities to meet this production goal, but their output will depend upon availability of raw materials such as sulfuric acid, benzene and chlorine, all in short supply. The production quota for the new period will be 10 million pounds more than the present year's output.

### **Apple Meeting Held**

The annual meeting of the National Apple Institute was held June 13-15 in St. Louis, Mo., with the Missouri State Horticultural Society as host. New officers elected at the meeting are: chairman of board, Reuben G. Benz, Yakima, Wash.; president, E. Blackburn Moore, Berryville, Va.; vice-president, Walter G. Martin, Wapato, Wash.; secretary, Cameron Garman, Burt, N. Y.; treasurer, C. E. Dutton, Milford Center, Ohio. Mr. Benz and H. W. Miller, Jr., Paw Paw, W. Va., were re-elected directors at large; and the retiring president, C. C. Taylor, Albion, Mich., serves in that capacity during the term of his successor. Twenty-two directors are named by the respective state and regional organizations comprising the National Institute.

### **Chem Exposition Planned**

The 23rd Exposition of Chemical Industries will be held at Grand Central Palace, New York from November 26 to December 1, it has been announced. Arrangements have been made to utilize all available space on the four exposition floors of Grand Central Palace.

### **Food Machinery Written Up**

The June issue of "Fortune" carried a report on the Food Machinery & Chemical Corp., San Jose, California. The report, entitled "Carrots to Chlorine", describes the growth of the corporation under its president Paul L. Davies and its recent mergers with Niagara Sprayer and Chemical Co., Middleport, N. Y. and Westvaco Chemical Corp., New York. The article is illustrated with both black and white and color pictures.



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 "Old Fashioned Squash Bug"  
 Squash lady beetle  
 Striped cucumber beetle  
 Spotted cucumber beetle

### CELERY

Lygus campestris  
 Celery leaf tier

### ASPARAGUS

Common asparagus beetle  
 Spotted asparagus beetle

### TOMATOES

Flea beetle  
 Colorado potato beetle  
 Blister beetle  
 Fruit worm

### POTATOES

Colorado potato beetle  
 Blister beetle  
 Flea beetle  
 Potato leaf hopper

### BEETS

Webworm

### LETTUCE

Corn ear worm

### SPINACH

Leaf tier

### BLUEBERRIES

Blueberry fruit fly

### ORNAMENTAL PLANTS

Box elder bug

### MISCELLANEOUS

Clover seed head caterpillar  
 Strawberry root worm  
 Cherry fruit fly

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## International Min. & Chem. Appoints Three



N. C. WHITE

S. B. MCCOY

M. S. MALONE

NELSON C. White has been named general manager and Sinclair B. McCoy sales manager for agricultural potash of the Potash Division of International Minerals & Chemical Corporation, according to an announcement by A. Norman Into, vice president in charge of the division. Milton S. Malone, sales representative of the division has also been appointed district sales manager of the Potash Division office at Atlanta, Ga. All three appointments became effective July 1.

Mr. White has been assistant manager of the Potash Division mine and refinery at Carlsbad, N. M., since 1947. He joined International in 1942, working on electrolytic production of magnesium and serving for two years as assistant manager of a magnesium plant operated by the corporation in Austin, Texas.

Mr. McCoy has been assistant to the vice-president in charge of the Potash Division since 1950, working on special assignments in the division, particularly in connection with sales. He has been with International since 1927, when he joined the company as a clerk in the traffic department.

Mr. Malone has been a potash sales representative covering the midwestern territory out of the company's Chicago office since 1948. He came to International from the General Chemical Division of Allied Chemical & Dye Corporation, with which he was associated in sales capacities from 1939 to 1948, except

for four years spent with Patton's 3rd Army during World War II.

Appointments to technical posts in The Davison Chemical Corporation, Baltimore, have been announced as follows: Dr. Joe D. Clary has been named superintendent of the specialty catalyst plant operated at Curtis Bay (Baltimore); Dr. Albert H. Cooper head of the Research Engineering Department of the Research and Development Division; Walter K. O'Loughlin manager of the development department of the Research and Development Division; and Kenneth E. Prince has joined the research and development division as head of the patent department.

### Davison Receives Award

A total of 22 safety awards, including the first one of its kind to a chemical company in Maryland, were made recently to the Davison Chemical Corporation for an outstanding safety record during the past year.

The National Safety Council has advised Davison that its corporate-wide safety record for 1950 has earned the Council's Distinguished Service to Safety Award, making Davison the first Maryland company of its size to win this award since the prizes were inaugurated in 1942.

The firm has received 18 "Certificates of Achievement" from the Manufacturing Chemists' Association and three "Certificates of Honor" from the Joseph A. Holmes

Safety Association. Four of the MCA A awards—18 of the 159 issued throughout the country last year—were made to the 145 employees in four plants of Davison's Mixed Fertilizer Division—at Alliance, Ohio, New Orleans, Louisiana, Perry, Iowa, and Savannah, Georgia—for operating through 1950 without a lost-time accident, a total of 295,849 injury-free hours for the year.

Seven of the MCA awards were presented to divisions employing 342 at Davison's Curtis Bay Works in Baltimore for a similar record of no lost-time accidents and a total of 721,696 injury free hours during 1950. The remaining seven MCA awards were made to units of the Phosphate Rock Division, employing 411 in Bartow, Florida, for operating through 1950 without a lost-time accident, and compiling a total of 919,466 injury-free hours.

### Texas Gulf Ups Output

By increasing the capacity of its Moss Bluff mine in Texas, Texas Gulf Sulphur Co. expects to up production by 50% at this installation, it is reported. The firm has ordered equipment for the expansion program.

Texas Gulf's sulfur producing plant in Spindletop Dome near Beaumont, Texas, is expected to begin production late in 1951, or early in 1952. While these developments are under way, the company is continuing to explore for new commercial deposits of sulfur which might be mined by the Frasch, or hot water, process.

### Jute Substitute Planted

American Kenaf Fibre Corp. has announced the commercial planting of 640 acres of kenaf, a substitute for jute, at Belle Glade, Fla. The kenaf plant, developed in Italy's pre-war colonies, was claimed by the company to be as tough and versatile as imported jute, but sack manufacturers indicated that jute made a more pliable bag that could be reused more often.



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### CSC Ups Ammonia Output

Commercial Solvents Corp., New York was recently granted a certificate of necessity to expand their Sterlington, La., facilities, it was announced by president J. Albert Woods. Construction will start immediately and the capacity of the ammonia and methanol production will be doubled.

In addition, the announcement stated that a new unit will be erected for the production of ammonium nitrate, widely used in the fertilizer field. Company officials believe the plant will be in production by January, 1953.

### Swain Fills USDA Post

Dr. Ralph B. Swain, U.S.D.A. entomologist, was recently assigned to Managua, Nicaragua under the Point Four plan. The assignment, made at the request of the Government of Nicaragua, will be for aid to that country in the control of insects affecting food and fiber crops.

### Innis, Speiden to I.M.C.Co.

All assets of the Isco Chemical Division of Innis, Speiden & Co., New York, became the property of International Minerals & Chemical Corporation and were so transferred at a meeting of officers and directors held July 2. All other assets of Innis, Speiden & Co. became the property of Innis, Speiden & Co., Inc., a wholly owned subsidiary of International Minerals & Chemical Corporation. These assets were transferred to Innis, Speiden & Co., Inc.

Directors of Innis, Speiden &

Co., Inc., are: W. H. Sheffield, Jr.; A. Norman Into; J. P. Margeson; R. P. Resch and N. C. White.

At its first meeting on July 2, the board of directors elected W. H. Sheffield, Jr., president; D. S. Cushman, vice-president; N. C. White, vice-president; G. S. Hamilton, secretary; and Edward Tubbs treasurer.

On the same day Mr. Sheffield, appointed the following officers: D. S. Cushman, general manager; F. T. Shanahan, personnel manager; M. H. Quartz, assistant treasurer; C. M. Edwards, assistant secretary and E. M. Crowe, assistant secretary.

Operations and responsibilities will continue substantially unchanged, the company says.

E. S. Browning Co., Inc., a wholly owned subsidiary of the former Innis, Speiden & Co. becomes a wholly owned subsidiary of the newly formed Innis, Speiden & Co., Inc.

### Joins Pennsalt in West

M. O. Anderson has joined Pennsylvania Salt Manufacturing Co. of Washington. He will make his headquarters at the company's office in Tacoma, specializing in chemicals for farm and dairy sanitation and in insecticides and weed killers for farm and home use.

Below: Group attending Del-Mar-Va Peninsula Fertilizer Association meeting at Ocean City, Md., last month. Representatives from NFA and APFC were present, as well as government and industry representatives. (Report in July issue)—Photo by Agricultural Chemicals.

### Chase Employees Honored

At a recent ceremony, Chase Bag Company's Philadelphia branch employees were honored for having completed 400,000 man hours without a lost time accident. John W. Satterwhite of the company's production headquarters, presented the Chase Safety Banner—a competitive award given annually to the branch having the least lost time accidents.

### Wheeler of CSC Honored

Maynard C. Wheeler, vice-president in charge of production, Commercial Solvents Corp., New York, recently received an honorary degree of Doctor of Engineering from Purdue University. Mr. Wheeler, who has been with CSC since 1923, was named vice-president in 1945.

### Termite Authority Retires

Dr. Thomas E. Snyder, authority on termites and their control, retired June 30, after 42 years of service in the U. S. Department of Agriculture. He is the originator, or instigator of most modern ways of controlling termites. Dr. Snyder entered Federal service in 1909.

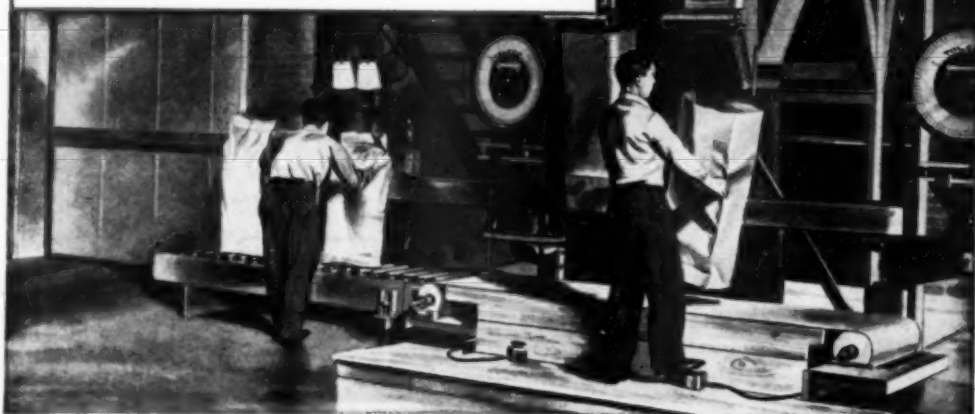
### F-M Seed Company Moves

Ferry-Morse Seed Co., San Francisco, has announced that their new plant at 111 Whisman Road, Mountain View, Calif., is ready for occupancy. The new plant is a one story brick building that contains approximately 160,000 square feet of floor space, and will house milling machinery, research and testing laboratories, offices and warehouses.



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## Suppliers' Bulletins

### CSC Booklet Issued

A new booklet describing the use of riboflavin as an ingredient in livestock, poultry, and other animal feeds has just been issued by the Agricultural Division of Commercial Solvents Corporation, 17 East 42nd Street, New York 17, N. Y. Included is a summary of the latest available information on the role of riboflavin in nutrition. It is available upon request.

### New Control Valve

Syntron Company, Homer City, Pa., has announced that a new type of valve for controlling the flow of bulk material and for free air control in heating and ventilating is now available.

### Hercules Booklet Out

A new, 24-page illustrated book describing toxaphene agricultural insecticides, has just been published by Hercules Powder Co., Wilmington, Del., manufacturers of the chemical base for toxaphene formulations.

The book includes sections on insect pests of economic importance, a brief history of the development of toxaphene and a list of common and scientific names of the insects mentioned in the story.

State and Federal recommendations are also given for the control of insect pests of cotton, livestock, alfalfa, peanuts and a variety of other insect pests, such as cutworms, armyworms and grasshoppers, all of which are controlled by the insecticide.

Copies of the informative booklet are available from the company, 970 Market St., Wilmington 99, Del.

### Copper-Saving Spray

Use of "Crag 658," a foliage fungicide produced by Carbide and Carbon Chemicals Company, New York, will save copper, according to a recent bulletin issued by the mak-

ers. The spray requires only one-third the amount of copper needed in sprays such as bordeaux or regular fixed-copper sprays. "Crag 658" is reported to have given good control in early and late blight in tomatoes and potatoes; leaf spot of tomatoes; leaf spot of peanuts; downy mildew; anthracnose; scab; and leaf spot of cucumbers and melons.

### Fla. Pesticide Booklet

A revised issue of "Handbook on Pesticides and Their Uses in Florida Agriculture" is now available, it was recently announced by L. O. Gratz, chairman of the Agricultural Extension Experiment Stations Committee, College of Agriculture, Gainesville, Fla. The new booklet is a compilation of an industry committee composed of representatives of organizations in the state and personnel of the Agricultural Extension Service.

### Concrete Storage Described

Marietta Concrete Corp., Marietta, Ohio, has recently installed a new storage system for the Delmar Feed Mill, Delmar, Del. The builders point out that concrete tanks conserve steel as much as 84% in an average installation, and can be erected without delay. Complete details for concrete storage facilities for fertilizer plants are available from the company, Dept. 46, Marietta, Ohio.

### Battelle Describes Work

Battelle Memorial Institute, Columbus, Ohio, has issued a recent bulletin illustrating and describing the institution's work in research for agriculture. The booklet discusses Battelle's facilities and personnel, pointing out the coordination of efforts toward a complete research program and the fact that the institute is physically well equipped to handle all types of agricultural research. Copies of the book, "Battelle

Research for Agriculture," are available from the Institute, Columbus, Ohio.

### Dust Collector Noted

The Day Company, Minneapolis, Minn., has literature describing its dust control equipment engineered particularly for plants where central dust control systems are not feasible. The air-dust separation takes place through two-stage action which utilizes internal skimmers. The dust-laden air enters at the side of the unit and spirals down to the cone outlet. Cleaned air spirals up through the internal skimmer stack, causing the extra-fine dust particles to concentrate in a tapered stack from which they are skimmed off and returned to the dust outlet, according to the makers. Full description is available from the company, Day Company, 810 Third Ave., N.E., Minneapolis 13, Minn.

### New Sprayer Information

John Bean Division of Food Machinery Corp., Lansing, Mich., offers complete literature on its line of sprayers for insecticides and weed-killers. The line includes a self-propelled "Hi-Lo" sprayer for corn borer, adjustable for different heights of corn; orchard sprayers in three types; hand sprayers for use on livestock pest control and tractor-mounted pumps for weed control chemicals. Write John Bean Division, Dept. AC-7, Lansing 4, Mich.

### "Surfactants" Described

A manual, designed to help a compounder make selections of emulsifying, dispersing or wetting agents, has been published by Antara Products Division of General Dyestuff Corporation, New York. The 12-page booklet, entitled "Antara Surfactants in Insecticides and Herbicides," describes the characteristics of "Surfactants," described as being of the alkylaryl polyethylene glycol ether types, the alkyl amide sulfonates and the sulphonated fatty acids. For a copy of booklet, write Antara Products, 435 Hudson St., New York 14, N. Y.



**For general farm pest control**—used as a residual spray for dairy barns, chicken houses, manure piles, garbage cans, dumps—use pressure spray, bucket pump or other hand spray. Also may be used as a paint on roosts, windows, doors, ceilings. Gives excellent control of poultry mites and lice when used on nests.

**For poultry pest control**



Only

## ISOTOX <sup>INSECTICIDES</sup> containing Lindane\*

meet so many of your needs—so effectively

1. Lindane is approved by U.S.D.A. for dairy barn fly control, and for direct application to dairy cows for lice and mange control.
2. High potency, rapid action—and 3-way kill of pests (by contact, stomach poison and vapor action).
3. Widely used in control of many crop pests

and with unprecedented success for the control of wireworms and other pests by seed treatment—also for control of food and grain storage insect pests.

**Specify ISOTOX Insecticides or use ORTHO Lindane** in your formulations. Write for free informative booklet containing the full story of the many uses of Lindane.

\*Approved name for the 99%+ "Pure Gamma Isomer" of Benzene Hexachloride.

**For livestock pest control—as a spray.** For mange and lice on hogs. Effective kill of lice and mange on dairy cattle, for sheep keds. Also for ticks, lice, horn flies, stable flies and mosquitoes on beef cattle and horses. Also may be used as dust for control of lice on dairy cattle, and lice, ticks, mosquitoes, fleas and horn flies on horses, cattle, hogs and goats as well as sheep ticks or keds. For pest control around milk plants, livestock, dairy barns, etc.



T.M.'S REG. U. S. PAT. OFF.  
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**For livestock pest control—as a dust**

**CALIFORNIA SPRAY-CHEMICAL Corp.**  
World Leader in Scientific Pest Control

Elizabeth 2, N. J.; Orlando, Fla.;  
Oklahoma City 4; St. Louis, Mo.;  
Richmond, Calif.

Offices Throughout U. S. A.

**AGRICULTURAL CHEMICALS**



# "Hardly Scratched the Surface in use of Plant Food," Vandecaveye tells Northwest Fertilizer Conference

**T**HE United States has hardly scratched the surface in use of plant food materials to improve soil fertility. That's what Dr. S. C. Vandecaveye, president of the Soil Science Society of America and a Washington State College soil scientist, told 200 fertilizer industry leaders and state college soil scientists who attended the three-day Northwest Fertilizer Conference at Oregon State college, Corvallis, Ore., June 27, 28 and 29.

Using Belgium and the Netherlands for comparison, Dr. Vandecaveye pointed out that the average annual nitrogen application in these two European countries is 63 pounds per acre to our three; phosphate applications average 102 pounds to our five, and potash applications exceed ours 100 pounds to three. Dr. Vandecaveye was featured banquet speaker.

First day of the program was devoted to foliar analysis. Expressing a hope that some day scientists will be able to tell a farmer exactly what fertilizer he needs by checking a plant sample, Dr. F. G. Viets, Prosser, Washington irrigation experiment station soil scientist, said plant tissue testing has uncovered soil deficiencies that have never been suspected.

He reported that sugar interests in Hawaii are far ahead of the field so far as plant tissue testing is concerned. More than 50,000 acres of sugar cane is being grown and fertilized, he related, on the basis of tissue tests. One of the problems to be surmounted is how to take samples from an annual plant as it approaches maturity, test, interpret results, and still benefit the growing

(Turn to Page 95)

Top picture (L to R): G. A. Fitzpatrick, Portland, Oregon, president of the Pacific Northwest Plant Food Association; Dr. S. C. Vandecaveye, Soil Science Society of America president and a Washington State College soil scientist; M. H. McVickar, National Fertilizer Association agronomist; and J. M. Quinn, Los Angeles, president of the California Fertilizer Association.

Second photo: George Wickstrom, Sumner, Washington, American Potash Institute representative and chairman

of the Northwest Plant Food association's soil improvement committee; Leroy E. Warner, Oregon State College soil conservation specialist; Dr. R. A. Pendleton, Oregon State college experiment station soil scientist, program chairman; and Dr. B. R. Bertramson, chairman of the Washington State College agronomy department, in charge of arrangements.

Third picture: Mac C. Taylor, Seattle, Washington, director; G. A. Fitzpatrick, Portland, Oregon, president; and E. B. Shipley, Portland, director of P.N.P.F.A.



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## **FARM-TESTED CHEMICALS**

**PHENACIDE**

(TOXAPHENE)

**TOXICHLOR**

(CHLORDANE)

**DED-WEED**

(2, 4-D)

**DED-TOX**

(DDT)

**TRI-6**

(BHC)

**BUSINESS IS BETTER THAN EVER!\***

**\* SEND IN YOUR ORDER NOW!**

**THOMPSON-HAYWARD**  
**CHEMICAL COMPANY**



**AGRICULTURAL DIVISION**

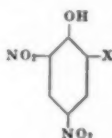
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MINNEAPOLIS • OKLAHOMA CITY • N. LITTLE ROCK • SAN ANTONIO • DES MOINES • DAVENPORT • NEW ORLEANS  
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# Industry Patents

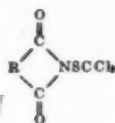
**2,552,562. METHOD OF MAKING BENZENE HEXACHLORIDE.** Patent issued May 15, 1951 to Kenneth C. Kauer, Francis N. Alquist, and Edgar C. Britton, Midland, Michigan, assignors to The Dow Chemical Company, Midland, Michigan. The method which comprises circulating benzene in a closed system, bubbling thereto an amount of chlorine sufficient to keep the benzene saturated therewith and an amount of propylene sufficient to initiate and to maintain the addition reaction between benzene and chlorine, but not in excess of one mol of propylene for each 6 mols of chlorine, maintaining the temperature of the reaction between 35° and 45° C., to product benzene hexachloride, and continuously withdrawing part of the circulating solution from the system and replacing it with a similar volume of benzene, to prevent the concentration of benzene hexachloride from reaching the saturation point in the circulating liquid.

**2,552,563. INSECTICIDE AND MITICIDE COMPOSITIONS COMPRISING HEXAETHYL TETRAPHOSPHATE AND A NITROPHENOLIC COMPOUND.** Patent issued May 15, 1951 to Eugene E. Kenaga, Midland, Michigan, assignor to The Dow Chemical Company, Midland, Michigan. An insecticide composition comprising as active toxicants (1) a nitrophenolic compound of the class consisting of 2,4-dinitrophenols having the formula:



wherein the substituent X is selected from the group consisting of cyclohexyl and alkyl radicals containing from 1 to 8 carbon atoms, inclusive, and the salts of said phenols, and (2) hexaethyl tetraphosphate, and wherein the mixture of toxicants exerts a synergistic effect as regards parasitidal toxicity.

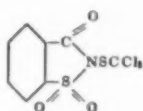
**2,553,770. PARASITICIDAL COMPOUNDS CONTAINING THE NSCCl<sub>2</sub> GROUP.** Patent issued May 22, 1951 to Allen R. Kittleson, Cranford, N. J., assignor to Standard Oil Development Company, a corporation of Delaware. As new chemicals, N-thiotrichloromethyl amide compounds corresponding to the following general formula:



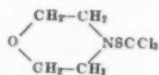
wherein R is an organic residue

**2,553,772. PARASITICIDAL COMPOSITIONS OF OLEFINS AND PERCHLOROMETHYL MERCAPTAN.** Patent issued May 22, 1951 to Allen R. Kittleson, Cranford and Howard L. Yowell, Westfield, N. J., assignors to Standard Oil Development Company, a corporation of Delaware. A parasitidal dust composition comprising the reaction product of an unsaturated organic compound selected from the group consisting of aliphatic and alicyclic organic compounds and perchloromethyl mercaptan as the active ingredient admixed with a powdered clay.

**2,553,773. N-(TRICHLOROMETHYLTHIO) O-SULFO BENZIMIDE AND FUNGICIDAL COMPOSITION CONTAINING IT.** Patent issued May 22, 1951 to Charles A. Cohen, Roselle Park, N. J., assignor to Standard Oil Development Company, a corporation of Delaware. As a new chemical compound, N-(trichloromethylthio) o-sulfo benzimide corresponding to the formula:



**2,553,774. N-THIOTRICHLOROMETHYL MORPHOLINE AND FUNGICIDAL COMPOSITIONS CONTAINING SAME.** Patent issued May 22, 1951 to Roger S. Hawley, Linden, N. J., assignor to Standard Oil Development Company, a corporation of Delaware. As a new chemical compound, N-thiotrichloromethyl morpholine corresponding to the formula:



**2,553,775. N-THIOTRICHLOROMETHYL AMIDES AND PARASITICIDAL COMPOSITIONS CONTAINING THEM.** Patent issued May 22, 1951 to Roger S. Hawley,

Linden, Allen R. Kittleson, Cranford, and Paul V. Smith, Jr., Westfield, N. J., assignors to Standard Oil Development Company, a corporation of Delaware. As new chemical compounds, N-thiotrichloromethyl amides.

**2,553,777. PARASITICIDAL COMPOSITIONS CONTAINING SUBSTITUTED DITHIOTRICHLOROMETHANES.** Patent issued May 22, 1951 to Roger S. Hawley, Linden and Allen R. Kittleson, Cranford, N. J., assignors to Standard Oil Development Company, a corporation of Delaware. A parasitidal composition comprising a substituted dithiotrichloromethane having the general formula



wherein R is a radical selected from the group consisting of alkyl, alkylthio, and alkoxy radicals and X is a radical selected from the group consisting of —S— and —O—, and a carrier therefore.

## Trade Mark Applications

**PENNSALT**, in bold face capitals contained within a rectangle which has the left and right lines tapering inward, the top and bottom lines are parallel with the bottom line shorter than the top and a keystone with a silhouette of a man's profile superimposed over the rectangle at the left end, for insecticides, herbicides and other chemicals. Filed June 23, 1948 by the Pennsylvania Salt Manufacturing Co., Philadelphia, Pa. Claims use since October 29, 1946.

**WEEVIL-CIDE**, in capital and small letters, shaded with the word in a semi-circle, the letter "I" being the highest letter in the circle, for fumigant for protection of grain, especially when stored or in transit. Filed March 21, 1949 by the Weevil-cide Company, Kansas City, Mo. Claims use since October 1, 1929.

**SANTA CLARA**, in capital letters, the word "Clara" below the word "Santa" and starting under the "n" of Santa, for fertilizers. Filed December 12, 1950 by Southern Fertilizer and Chemical Co., Savannah, Ga. Claims use since December 15, 1928.

**ORTHORIX**, in bold face capitals, for parasitides - namely insecticides and fungicides. Filed March 20, 1950 by California Spray-Chemical Corporation, Wilmington, Del. Claims use since June, 1949.

**FAMOUS FREDERICK COUNTY LIME**, in capital letters enclosed by a circle and enclosing a circle, the letters are in the form of a semi-circle, for lime for fertilizing. Filed August 18, 1947 by the M. J. Grove Lime Company of Frederick County, Lime Kiln, Md. Claims use since July 1, 1875.

# 3,895,000 REASONS FOR FAITH

*Twenty companies spend nearly 4 million dollars annually for research in the development of pesticides. More than 100 other companies spend an additional amount each year. This investment is reflected in the high degree of efficacy of pesticides and the knowledge necessary to protect the public against misuse.*

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## Hammond Bag Co. to Build New Plant



**H**AMMOND Bag and Paper Company, Wellsburg, W. Va. has started construction of a new multiwall paper bag plant at Pine Bluff, Arkansas. Expected to be in operation by September 1, this new \$300,000 fireproof plant will replace the company's present Pine Bluff facilities which are being taken over by the Chemical Corps of the Army on that date.

The one story, reinforced concrete factory, which will provide 60,000 square feet of floor space, is being built on 7 acres of ground located on the Cotton Belt and Missouri Pacific Railroads. Architects are Erhart, Eisenbaum and Rauch of Little Rock, Arkansas. Peterson, Garbi and Joseph, Inc. of North Little Rock, Ark., are the general contractors.

In order to minimize the loss of production time the company has developed a plan to move and place the machinery in operation a piece

at a time as the building goes up. This will allow most of the production equipment to remain in operation either in the new plant or the old as individual machines are being moved.

Allen E. Weaver is local manager of the Pine Bluff plant and J. E. McDonald is superintendent. At present there are about 130 people employed there.

### New Warfarin Instructions

Wisconsin Alumni Research Foundation, Madison, has announced the release of further warfarin publicity material plus suggestions regarding finished warfarin bait in hot weather. Some of the suggestions are: (1) keep the moisture content of the product below 10%; (2) it is advisable to make up the bait in frequent batches to shorten the storage period; (3) several manufacturers recommend the use of oats as an ingredient of bait in summer because

oats have antioxidant properties which tend to retard the development of rancidity in any cereal mixture; and (4) use only the best quality, mature, sound, cereal grains in warfarin bait.

### 2,4-D Suit Explained

Formulators of 2,4-D have made numerous requests for clarification of the suit filed in the District Court of Eastern Arkansas against the Reasor-Hill Corporation of Jacksonville, Ark., by the Boyce Thompson Research Foundation, Yonkers, N.Y. The suit was instituted to prevent the defendant, Reasor-Hill Corp., from manufacturing and selling 2,4-D without license from the plaintiff, Boyce Thompson Research Foundation.

A letter from Lyle O. Hill, vice-president of Reasor-Hill, written to Agricultural Chemicals, explains the issue involved:

"1. This is an action, arising under the patent laws of the United States, of which this Court has jurisdiction under Title 28, United States Code, Section 1338(a).

"2. On May 24, 1949, Reissue United States Letters Patent No. Re. 23,115 was duly and legally reissued to E. I. du pont de Nemours and Company, a corporation of Delaware, for "Plant Regulant Composition and Method" and since that date plaintiff, Boyce Thompson Research Foundation, Inc., a corporation of the State of New York, by virtue of an agreement between it and the said E. I. du pont de Nemours and Company, has had the right to grant licenses under







*Note weed-free rows, result of Premerge treatment.  
Row treatment is desirable for many crops.*

***An Important  
New Dow Product  
For An Important  
New Farming Practice***

# PREMERGE

## **A dinitro weed killer for pre-emergence weed control**

An outstanding development of Dow's continuing research in the agricultural chemical field is **PREMERGE**—an important new aid for growers of cotton, beans, corn, potatoes, peanuts, soybeans, sorghum and similar large-seeded crops.

**PREMERGE** is a dinitro type weed killer designed specifically for *pre-emergence* weed control—that is, for control of many annual seedling weeds and grasses by application to the soil after planting certain crops, but before emergence of the crop plants. This new treatment gives good weed control during a critical period in the life of the crop, and its effect lasts until the crop plants have developed beyond the tender seedling stage. After this, cultivation can be done safely.

Furthermore, the use of **PREMERGE** serves as low-cost insurance against wet soil conditions which delay cultivation and can thereby "save" a crop from being overrun with weeds. Specifically,

it prevents the development of small-seeded weeds and grasses such as pigweed and crabgrass which normally germinate in the top one-fourth to one-half inch of soil. It will *not* control established weeds and grasses such as bindweed, coffee weed, nut grass, Bermuda grass, Johnson grass and quackgrass.

**On Cotton**—Application should preferably be made at time of planting, with spray equipment mounted on the planter—or within 24 hours after planting. In commercial use this year on thousands of cotton acres in Mississippi, Louisiana and Arkansas—**PREMERGE** successfully controlled germinating weed and grass seedlings for six weeks or longer.

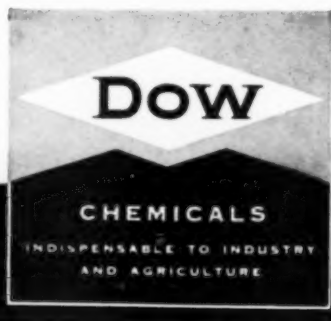
**On Other Crops**—**PREMERGE** can be used effectively on certain other large-seeded, deep-planted crops. These include peanuts, beans and corn, as well as tuber (potatoes) and bulb (gladiolus) plantings—also perennial plantings such as asparagus.

*Your inquiries are invited. Dow Technical Service men are available to help you use **PREMERGE** to best advantage.*

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**THE DOW CHEMICAL COMPANY**  
MIDLAND • MICHIGAN

**USE DEPENDABLE DOW AGRICULTURAL CHEMICAL PRODUCTS**

WEED, BRUSH AND GRASS KILLERS • INSECTICIDES  
FUNGICIDES • PLANT GROWTH REGULATORS  
GRAIN AND SOIL FUMIGANTS • WOOD PRESERVATIVE



and sue for infringement of said Reissue Letters Patent; since on or about March 5, 1951, plaintiff Boyce Thompson Research Foundation, Inc., by a duly executed assignment from said E. I. du Pont de Nemours and Company, has been and still is the owner of the entire right.

"3. Defendant has been and still is infringing Claims 2, 4 and 5 of said Reissue Letters Patent by manufacturing and selling, without right or license from Plaintiff, plant regulant compositions, containing as an essential active ingredient a compound known to the trade as "2,4-D", embodying the patented invention and will continue to do so unless enjoined by this Court.

"4. Plaintiff has caused the required statutory notice to be placed on all plant regulant compositions embodying the invention of said Reissue Letters Patent sold by plaintiff's licensees and defendant has been notified of their infringement.

"WHEREFORE, plaintiff demands a preliminary and final injunction against further infringement of said Reissue Letters Patent by defendant and those controlled by it, an accounting of damages, and an assessment of costs against defendant, reasonable attorney's fees and such other further relief as to the Court may seem just."

#### Ky. Firm Incorporates

Tobacco States Chemical Co., Lexington, Ky., organized in 1945 by C. D. Bias, now president, recently incorporated with \$5000 capital stock. Other officers of the firm are George Frith, vice-president, and Robert M. Bias, treasurer.

Tobacco States Chemical Co. makes a complete line of agricultural insecticide and fungicide products, including many based on ro-

tenone, cube, DDT, chlordane, and toxaphene. The company also handles products made by Dow, DuPont, Chapman, and others on a jobbing basis. In 1949, Tobacco States moved into a new building with 4000 square feet of floor space but found it necessary to build a 6000 square foot addition last fall.

#### New Fertilizer Review

The April-May-June issue of *Fertilizer Review*, published by the National Fertilizer Association, now available, contains articles on grassland improvement, development of the fertilizer industry in the middle western states, fertilizer consumption in 1950, and an article: "A Threat to Agricultural Production" which gives a review of the sulfur shortage.

#### Spencer Ammonia Report

Spencer Chemical Co., Kansas City, Mo., has released a report on the economics of anhydrous ammonia for direct fertilizer application. The report is a study of the cost factors affecting the application of anhydrous ammonia and ammonium nitrate, and covers a history of anhydrous ammonia and its relative cost of application to the farmer, custom applicator, distributor and producer. The report gives various examples of application costs and comparison charts for both products.

#### Chem Co. Purchased

The Geo. C. Gordon Chemical Co., Kansas City, Mo. was recently purchased by Kenneth J. Ste-



BUNTING

STEPHANY

phany and Henry S. Bunting, both of Kansas City. Mr. Stephany will be president of the new corporation and handle production while Mr. Bunting will be vice-president and in charge of sales. The company will be incorporated under the name of Gordon Chemical Co. and will continue to operate from 1100 Hickory, Kansas City, under a leasing arrangement with George C. Gordon, former owner of the company, who founded it 27 years ago.

#### Chem. Use Up in Canada

Canadians spent \$15,427,000 on insecticides during the year 1950 according to information recently announced by the Bureau of Statistics of the Canadian Government.



### Keel Appointed by IMC

S. T. Keel has been appointed domestic sales manager of the Phosphate Division of International Minerals & Chemical Corporation. His headquarters will be in the Chicago offices of the corporation. Mr. Keel has been manager of the southern district of the phosphate sales department for the past four years and has been with International over 10 years.

R. W. Linderman, formerly northern district sales manager, has succeeded Mr. Keel in Atlanta.

### Builds New Storage Tank

Baugh Chemical Co., Baltimore, Md., is building a new 460,000-gallon sulfuric acid storage tank at its fertilizer plant. The firm is also rebuilding part of its pier which was enlarged some months ago.

### Minn. Fertilizer Program

The program for the 27th annual meeting of the National Joint Committee on Fertilizer Application being held jointly with the American Society for Horticultural Science, has been announced by R. L. Carolus, program chairman. The meeting, to begin at 9:30 a.m. September 10, will be held at the University of Minnesota, St. Paul.

The morning program will feature a report by A. L. Kenworthy and his committee on "New Concepts and Recent Practices in the Use and Application of Fertilizer to Deciduous and Small Fruits," a panel on "Future of Leaf Analysis as a Diagnostic Tool for Determination of Fertilizer Requirement of Fruit Crops," with W. P. Judkins, Va., as chairman and the following participants: A. F. Camp, Fla.; A. L. Kenworthy, Mich.; O. Lilleland, Calif.; M. E. McCollam, Calif.; G. F. Potter, La.; N. J. Shaulis, N. Y.; and E. K. Walrath, Mass.; a panel on "Use of Fertilizer Solutions in Leaf Feeding," with N. F. Childers, N. J., as chairman and the following participants: Damon Boynton, N. Y.; A. F. Camp, Fla.; L. L. Danielson, Va.; T. A. Merrill, Wash.; E. R. Parker, Calif.; and S. H. Wiet-

wer, Mich.; and a paper on "Recent Fertilizer Machinery Developments Particularly for Horticultural Crops" by G. A. Cumings, Agricultural Engineering, USDA.

At the afternoon session, G. E. Muhr, Green Giant Company, Le Sueur, Minn., will present a paper on "The Importance of Some Easily Measurable Factors of Soil Fertility and Land Management in the Production of Sweet Corn;" and a committee report in panel style on "New Concepts and Recent Practices in the Use and Application of Fertilizer to Vegetable Crops," by J. B. Hester, chairman, and the following participants: M. T. Vittum, N. Y.; E. R. Purvis, N. J.; M. L. Odland, Pa.; E. P. Brasher, Del.; and V. A. Tiedgens, Va.

### New Lion Herbicide

Lion Oil Company has announced a new weed and grass killer known as "Lion Herbicidal Oil No. 6." The product is said to be relatively non-toxic and poses no danger to livestock, persons, or to gardens, flowers and ornamental shrubbery adjacent the areas treated.

The herbicide is classed as a general contact agent and is claimed to be more economical and efficient for application along railroad rights-of-way than other types of chemical sprays. The oil is non-inflammable and non-irritating to the skin, making it safe to handle. Unlike some other types of chemical weed-killers, it leaves no permanent residue toxic to soil or livestock.

### To Build Ammonia Plant

Shell Chemical Corporation will add a new synthetic ammonia plant to its other petrochemical manufacturing units at Dominguez, California, it has been announced. The new plant, near Los Angeles, is needed to supply nitrogen fertilizer to the farmers of Arizona, California, Oregon and Washington. Raw material for the synthetic reaction will be natural gas and air. Construction of the multi-million dollar plant will begin this year with completion scheduled for late in 1952.

### New Weed Killer

Chemicals Procurement Company, New York, has announced the availability for experimental purposes, of a 2,4-D isopropylamine citrate containing 73% 2,4-D acid equivalent.

The material known as "Weed-Out" is claimed to be completely water soluble. The sequestering agent, citric acid, has the property of tying up calcium and magnesium ions present. This property is said to be particularly advantageous in rural areas where water softening equipment is scarce.

### Virginia Insecticide Law

In an article by Dr. C. C. McDonnell in the June issue of *Agricultural Chemicals*, an error has been pointed out in our listing of provisions of the Virginia Insecticide, Fungicide and Rodenticide Law. We indicated in error that the annual fee for registration aggregated \$200 for listing multiple brands. The Law actually provides as follows:

"shall pay to the Department an annual inspection fee of ten (\$10.00) dollars for each and every brand or grade to be offered for sale in this State; Provided, however, that any registrant may register annually any number of brands after the payment of annual fees aggregating two hundred dollars, by paying an annual fee of five dollars for each economic poison submitted for registration, in excess of the first twenty."

### Foreign App'ts Announced

The U. S. Dept. of Agriculture has announced its sending a number of scientists to allied countries to assist in their agriculture.

Carl C. Blickenstaff, entomologist, left by plane July 30, for a Point Four technical cooperation assignment in Monrovia, Liberia. Mr. Blickenstaff was an instructor in entomology at Iowa State before joining the U.S.D.A. last year.

Other appointments included that of Frank G. Davis, economist, to Liberia; Dr. George Stewart, agronomist, to Iran; and F. A. Ralston, livestock specialist, also to Iran.



## *The attack is on!*

*It's a rout. The bugs in the north are fleeing in terror. It's the worst catastrophe since the invention of fly paper!*

*The big equipment is moving up. You can hear the giant motors and the crunch of powerful wheels in the distance. The farmers aren't fooling this time.*

*They've got their planes and tractors loaded with the deadliest ammunition yet formulated — Geigy's dusts and sprays.*

*Sound retreat! Get me a fresh horse or the bugs in the south will never know what hit 'em.*

Aldrin  
Arsenicals  
BHC  
Carbamates

Chlordane  
Copper  
DDT  
Fumigants

Dieldrin  
Lindane  
Methoxychlor  
Parathion

PCP  
Purified DDT  
Pyrethrum  
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Sulphur  
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2,4-D & 2,4,5-T

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GEIGY COMPANY, INC.

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Dealer & Distributor Inquiries Invited

AUGUST, 1951

83



**250 pounds of  
Ammonium Sulphate  
increase corn yield  
11 bushels an acre**

JOHN M. COOPER OF SLIPPERY ROCK, PA., a vocational agriculture student, tested the direct application of Ammonium Sulphate on his 1950 corn crop and was more than pleased with the results.

"On one acre," he says, "I broadcast and plowed down 250 pounds of Ammonium Sulphate. This gave a yield of 85 bushels per acre. The remainder of the field had no preplanting fertilizer application and the yield was 74 bushels per acre."



**Bigger yields for farmers  
... better business for you**

• U-S-S Ammonium Sulphate, in high-analysis mixed fertilizers or applied directly to the soil as in the case cited here, steps up both yields and profits for farmers who use it.

Farmers everywhere, young and old, are enthusiastic over the results obtained by using U-S-S Ammonium Sulphate on their crops. So be ready to get your share of this business by including U-S-S Ammonium Sulphate in your line . . . both in 100-

pound bags for direct application and in your high-analysis complete fertilizers.

Dry, free-running U-S-S Ammonium Sulphate stands up well in storage . . . doesn't corrode drills or other distributing equipment.

Heavy demand is taxing supplies of U-S-S Ammonium Sulphate this season, so anticipate your needs well in advance. United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.



**U-S-S AMMONIUM SULPHATE**

**UNITED STATES STEEL**



### Mrs. Alfred Weed Dies

Jean Droppers Weed, wife of Dr. Alfred Weed, vice-president of John Powell & Co., New York, died July 16 at the Post Graduate Hospital, New York, following an operation. Mrs. Weed was believed to be well on the road to recovery but took an unexpected turn and passed away suddenly. Funeral services were held at Fairchild Chapel, Flushing, L. I., on July 18. In addition to Dr. Weed, she is survived by three children and her mother. Both Mrs. Weed and her husband were graduates of the University of Wisconsin.

### Dr. Waggoner Appointed

Dr. Paul E. Waggoner has been appointed to the staff of the plant pathology department of the Connecticut Agricultural Experiment Station, New Haven, according to an announcement by the station. Dr. Waggoner will conduct research on the effect of atomic radiation on plant diseases.

### More German Fertilizers

Fertilizer consumption in German Federal Republic increased about 10 percent during the past sales year from July 1, 1950 to June 30, 1951. According to estimates from Frankfurt, consumption in the previous sales year was about 1,904,000 tons.

Despite the increase, however, it was indicated that actual requirements were filled only about 66%. The failure was not due to unwillingness of the farmer to buy nor of industry to manufacture, but rather to transportation difficulties, according to German sources of information.

### Pesticide-Fertilizer Mixtures Vetoed by Group

A resolution recommending that fertilizer control officials not register nor permit sale or custom mixing of fertilizers containing pesticides, was adopted by the Southern Feed and Fertilizer Control Officials at their recent meeting at St. Petersburg, Fla. Introduced by the group's

president, Rodney C. Berry, Richmond, Va., the three-point resolution was as follows:

"1. In view of the long lasting effects of the misapplication of pesticides, it is recommended that fertilizer control officials of this Association not register, permit the sale or the custom mixing of fertilizers containing pesticides for field crop or horticultural use, unless such mixtures have been formerly approved by the Officials of the Agricultural Experiment Station or other officials vested with such responsibility by Law in their State.

"2. It is believed that the use of mixtures of fertilizers and pesticides is generally based on the economics of the practice and that the danger of contaminating crops or soils or both by misapplication, by inappropriate levels and methods of application is real and does not warrant the savings in labor costs.

"3. Mixtures of pesticides and fertilizers which are registered for sale should be properly labeled and meet all requirements of both the fertilizer and pesticide laws of the various States."

Members of the organization's committee on pesticides in fertilizers are E. A. Epps, Jr.; J. J. Taylor and M. P. Etheredge. In commenting on the resolution, Mr. Berry said that the control officials desired to proceed cautiously in this matter and had no intention of stifling experimentation with pesticide and fertilizer mixtures.

## PACIFIC AAEE

(Continued from page 45)

R. L. Metcalf of the University of California Citrus Experiment Station reported on activators for DDT against house flies. More than eighty compounds structurally related to DDT were tested as activators for DDT against resistant house flies, he said. Fifteen of the compounds increased the activity of DDT one hundred times or more.

A. W. Lindquist, of the Bureau of Entomology and Plant Quarantine discussed the distribution of C<sup>14</sup>-labelled DDT in house flies. The radioactive DDT was supplied topically to house flies and its distribution externally and internally in the flies was determined.

S. C. Jones of Oregon State College discussed the use of radioac-

tive phosphorus as a tracer in determining the migration of the cherry fruit fly. The radioactive phosphorus was included in the food of the adult flies. Treated flies lived for a long time after treatment.

A. W. Lindquist, of the Bureau of Entomology and Plant Quarantine discussed radioactive materials in entomological research. The location of tagged molecules in the insect body is possible and constitutes an extremely sensitive method of micro-analysis. Synergists and activators could be studied in this manner in combination with insecticides. Insects can recombine radioactive elements into new compounds, as for example, the silk worm wherein radioactivity has been shown to appear in the silk.

A series of three papers on systemic insecticides were presented by H. T. Reynolds, W. H. Lange, and R. L. Metcalf. These papers reported good control obtained with octamethyl pyrophosphoramide ("Pestox III") and a trialkyl thiophosphate ("Systox") when tested on truck and field crops for the control of certain aphids and mites. Particularly interesting was the control of root-dwelling aphids by the application of foliage sprays.

Ernest Hart, President of the National Agricultural Chemicals Association discussed the availability of raw materials for the manufacture of insecticides. He pointed out that a happy and workable union has developed between the government research entomologists and the insecticide manufacturing companies. Insecticidal compounds can be produced one thousand to one faster than they can be screened and tested in the field, he said.

Mr. Hart explained that raw materials now used in insecticides such as benzol, chlorine, sulfuric acid, and alcohol are also strategic war materials.

R. F. Peters of the Bureau of Vector Control, California State Department of Health, discussed mosquitoes as economic insects in the light of ever increasing irrigation practice. Today, over two million

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dollars are expended annually in California on mosquito control and the irrigated acreage bids to nearly double in the next two decades.

Three papers on the control of various citrus insects were presented by W. H. Ewart and E. L. Atkins of the University of California Citrus Experiment Station. H. R. Yust, of the Bureau of Entomology and Plant Quarantine discussed the physiology of resistance to HCN in California red scale, particularly the oxygen consumption of resistant and non-resistant strains before and after fumigation with HCN.

J. C. Chamberlin of the Bureau of Entomology and Plant Quarantine reported results on the relationship of the point of spray discharge to the place of deposit by airplane applications at two and ten foot flight elevations. Deposit of sprays from uniformly spaced nozzles was found to be non-uniform across the swath, and nozzle arrangements were devised to yield a fairly uniform deposit.

## WASHINGTON

(Continued from page 57)

mittee on Pest Control to succeed the late Dr. S. A. Rohwer who had headed it since the beginning in 1946. According to Dr. S. W. Simmons, U. S. Public Health Service, newly-elected Committee secretary, meetings of the Committee will be held quarterly, with extra sessions being called by the chairman if he deems it necessary.

The committee has taken a leading part in the adoption of coined names for insecticides and fungicides and has considered various problems presented to it by government agencies and the industry. Secretary Simmons states that the group "will be active in coordinating the release of policy information in the field of pesticides and stands ready to consider major problems" of pest control.

Present members of the Interdepartmental Committee are:

Dr. W. G. Reed, Chief, Insecticide Division, Livestock Branch, PMA,

**AGRICULTURAL CHEMICALS**

USDA: Dr. H. L. Haller (Chairman), Assistant Chief, Bureau of Entomology and Plant Quarantine, USDA; Dr. Paul A. Neal, Chief, Laboratory of Physical Biology, National Institute of Health, U. S. Public Health Service; Dr. S. W. Simmons (Secretary), Chief, Technical Development Services, Communicable Diseases Center, U. S. Public Health Service, Savannah, Georgia; Dr. A. J. Lehman, Chief, Division of Pharmacology, Food and Drug Administration, Federal Security Agency; Dr. Clarence Cottam, Assistant Director, Fish and Wildlife Service, Department of the Interior, Washington, D. C.; Comdr. Frank R. Philbrook (MC), Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.; Lt. Comdr. Richard T. Holway (MSC) USN, Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.; Harry Fleisher, Bureau of Ships, Department of the Navy, Washington, D. C.; Lt. Col. Frederick W. Whittemore, Jr. (MSC), Environmental Sanitation Branch, Office of the Surgeon General, Department of the Army, Washington, D. C.; Dr. Ray Treichler, Office of the Quartermaster General, Department of the Army, Washington, D. C.; W. D. Reed, Department of the Army, Office of the Chief of Engineers, Repairs and Utilities Division, Insect and Rodent Control Section, Washington, D. C.; and Major L. C. Kossuth (MC) (USAF), Chief, Preventive Medicine Branch, Professional Division, Office of the Surgeon General, USAF Department of the Air Force, Washington, D. C.

The next meeting of this committee will be held on September 21, 1951, Dr. Simmons said.

### St. Regis Builds in Canada

St. Regis Paper Company (Canada) Limited will begin construction at once of a multiwall bag plant at Dryden, Ontario, according to an announcement by Thomas H. Cosford, vice president and managing director. The new plant will replace one now leased from the Dryden Paper Company Limited and will provide a capacity three times that of the present plant.

The plant will be a modern one-story structure covering 73,000 square feet. Completion is expected by the end of this year. J. M. Harnit, vice-president in charge of multiwall paper bag manufacturing, will be in general charge of the construction and subsequent manufacturing operations in Dryden. Clarence M. Witt, manager of the company's present bag plant at Dryden, will assume the same position in the new plant.

## TECHNICAL BRIEFS

(Continued from page 61)

cial groves in central Florida. One grove of young Washington Navel oranges was severely affected in the dry winter and spring of 1948-49. Nearly half of the leaves were dropped in February, leaving large areas of bare stems and branches. A spray of 1 lb. of borax per 100 gal. was applied to some trees on March 16 while the trees were still dormant. This resulted in earlier appearance of the spring growth, better color of foliage, disappearance of the deficiency symptoms, and about 30% increase in crop. The young leaves of the trees with the applied borax were found to contain about 20 p.p.m. of borax, whereas the untreated leaves contained about 5 p.p.m.

The leaf symptoms of boron deficiency develop before the fruit symptoms appear, and their identification enables the grower to apply correctional measures in time to help the current crop of fruit.—Condensed from an article by Paul F. Smith and Walter Reuther which appeared in the Proceedings of the Florida State Horticultural Society.

## DELANEY

(Continued from page 30)

committee chairman, or one who is simply looking for testimony to corroborate his own preconceived views. And the essential purpose of his article in *American Magazine* seems to be to arouse and scare the public, and to prompt a wave of letters to Congressmen to "insist that Congress give the Food and Drug Administration adequate legislation to handle the problem before (these chemicals) get on the market." It may be that public apathy up to this point does not assure Mr. Delaney of getting the legislation which he has apparently already decided that he wants.

As a further testimonial to Mr. Delaney's evident inability to resolve these important questions fairly and intelligently, examine his explanation of why chemicals, in-

secticides, etc., are used in connection with the production of food. "The answer is easy," he says. "They are relatively cheap, easy and work 'wonders' as preservers, blenders, softeners, bleachers, emulsifiers, insect and fungus killers and crop stimulators."

Not a word from Chairman Delaney as to the important testimony offered by leading scientists of the U.S.D.A. that in the growing of certain crops insecticides and fungicides are absolutely essential, and that without insect and fungus control there would be no marketable crop. No, according to Mr. Delaney, these products are used simply because they are relatively "cheap and easy." And no word of distinction between pesticides and other products which in many cases are admittedly not essential, but are added merely to improve color, flavor, and keeping qualities. No, as far as Chairman Delaney is concerned they are just "chemicals" and since they may cause cancer, polio and virus X, let's have some further legislation to control them, regardless of the adequacy of present controls.

Why, we wonder, should we be speculating at this late stage on what "may" be caused by this or that. The industry has been through six months of FDA residue tolerance hearings, and another six months of Delaney Committee hearings. If no real scientific evidence has been brought to light to establish beyond a reasonable doubt what the true situation is, then we feel the chairman of the committee would do far better to wait until such authentic evidence is in, rather than simply repeat the unproved and irresponsible testimony of unqualified witnesses.

## ACS MEETS

(Continued from page 53)

Pile," by A. A. Nikitin and Josephine W. Rainey; "Trace Element Nutrition in Relation to Our Deficient Soils," by W. D. McElroy; and "Physical Properties of Ammonium Nitrate-Ammonia-Water and Urea-Ammonia-Water Solutions," by

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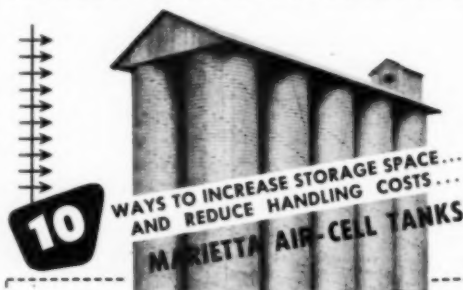
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#### Pesticides Discussed

SECTION 13, on Pesticides, will meet Tuesday morning, September 11, at the Governor Room, Hotel Governor Clinton, New York, with Dr. H. L. Haller as chairman. Dr. S. A. E. McCallan is vice-chairman and C. J. Krister, secretary. Following Dr. Haller's introductory remarks, the following papers will be presented: "Some Biochemical Factors in the Resistance of Houseflies to DDT," by W. M. Hoskins, A. S. Perry, O. H. Fullmer and A. S. Tahori; "Research Made on a New Insecticide Which is Active Against Resistant *Musca domestica*," by Robert Wiesmann; "Radioactive Tracer Studies in Insecticidal Biochemistry," by F. P. W. Winteringham; "Recent British Developments in the Taint-Free Use of BHC," by E. Holmes; "The Effects Associated with Toxicity and Plant Translocation of Three Phosphate Insecticides," by M. M. I. Zeid and L. K. Cutkomp; and "First Steps in the Biochemistry of the Systemic Insecticides," by G. S. Hartley and D. F. Heath.

C. W. Kearns will preside at the afternoon session, scheduled to hear five papers: "Decreased Toxicity and Cholinesterase Inhibition in a New Series of Dithiophosphates," by G. A. Johnson, J. H. Fletcher, K. G. Nolan and J. T. Cassaday; "Ethyl p-Nitrophenyl Thionobenzenephosphonate ("EPN")—Chemical Characteristics, Biological Activity and Pesticidal Use," by S. S. Sharp; "The Newer Insecticides and Their Application in Mosquito Control," by Joseph M. Ginsberg; "Research and Practice in Aerial Application of Pesticides in the United States," by K. Starr Chester; and "The Agricultural Consumption of Insecticides," by Harold H. Shepard.

Dr. McCallan will preside at the next morning's session, a continuation of the section's program. The following papers are scheduled: "Present Status of Fungicide Development," by John C. Dunegan; "Fungicidal Control of *Phytophthora*

*palmivora* Butl. on *Theobroma cacao* L. in Costa Rica," by J. H. McLaughlin and G. F. Bowman; "Using Dosage-Response Data to Distinguish Inherent Toxicity from Permeation," by Saul Rich and J. G. Horsfall; "Sigatoka Disease of the Banana Caused by *Cercospora Musae*," by N. C. Thornton and V. C. Dunlap; "The Efficacy of Certain Substituted Phenols and their Salts as Fungicidal Agents," by Gene M. LeFave and B. L. Skiles; and "The Fractionation

of Fungicidal Dust Mixtures and Some of Their Ingredients," by J. D. Wilson and Frank Irons.

The Toxicological aspects of pesticides will occupy the Wednesday afternoon session with the presentation of five papers. "A Summary of the Principal Pharmacological Aspects of the Commercially Important Insecticides" will be given by A. J. Lehman, followed by: "Effect of Feeding Rats Tissues from Sheep and Butterfat from Cows that had

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0.025%	10.2	11.6	18.2	28.8	36.4	31.6	41.8	60.5	63.5	68.5
0.0375%	9.0	11.0	14.8	16.5	22.4	23.6	37.0	42.4	44.7	47.2
0.05%	2.6	2.8	3.0	3.4	4.8	5.6	6.8	7.0	7.5	7.8
0.1%	—	2.6	2.8	2.8	2.8	2.8	3.6	5.4	5.6	5.8
0.2%	—	—	—	—	—	—	—	—	—	—
0.4%	—	—	—	—	—	—	—	—	—	—
Standard 0.2%	8.2	14.4	20.0	21.5	23.8	24.8	28.4	30.0	34.0	x
Untreated	37.4	71.0	100.0	x	x	x	x	x	x	x

TEST II Dilution:	After 2	4	6	8	11	13	16	18	20	22 days
0.01%	6.0	17.6	28.2	36.2	48.0	51.4	56.8	69.2	77.0	83.0
0.025%	5.2	18.0	27.8	33.8	41.6	45.8	51.7	63.0	73.6	77.0
0.0375%	3.2	10.6	14.0	15.8	22.4	25.4	32.8	44.6	48.6	51.2
0.05%	—	2.4	2.6	3.0	3.0	3.0	3.0	3.0	3.0	3.2
0.1%	—	—	—	—	—	—	—	—	—	—
0.2%	—	—	—	—	—	—	—	—	—	—
0.4%	—	—	—	—	—	—	—	—	—	—
Standard 0.2%	4.2	16.8	23.6	25.0	28.5	30.0	32.0	34.0	x	x
Untreated	18.2	68.0	87.0	x	x	x	x	x	x	x

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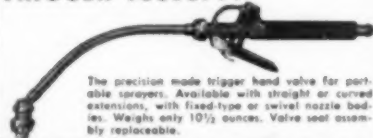
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Consumed DDT-Dusted Alfalfa Hay," by D. A. Greenwood, L. E. Harris, Clyde Biddulph, Wayne Binns, M. L. Miner, L. I. Madsen, J. R. Harris and F. K. Mangelson; "Toxicological Studies on the Zinc and Disodium Salts of Ethylenebis-dithiocarbamates," by R. B. Smith, Jr., J. K. Finnegan, P. F. Sahyoun, H. B. Haag and Paul S. Larson; and "Safe Standard of Use for Pesticides—Their Development and Application," by Bernard E. Conley.

#### 8 Herbicide Papers

**H**ERBICIDES will be discussed at the September 7th session at the Governor Clinton. This session, with S. J. P. Chilton presiding, is scheduled to hear eight papers, as follows: "Absorption of 2,4-D by Sugar Cane," by J. A. B. Nolla; "Formative Activity of Functional Derivatives of 4-Chlorophenoxyacetic and 2,4-dichlorophenoxyacetic acids," by R. L. Weintraub, J. W. Brown and J. A. Throne; "Comparison between Methoxone, 2,4-D and 2,4,5-T as Weed and Brush Killers under Swedish Conditions," by Ewert Aberg and Erik Hagsand; "Chemical Structure in Relation to Fungicidal and Plant Growth—Regulating Activity of Aryloxy Acids," by R. L. Wain; "Preferential Resistance to Chemical Changes Due to Soil Micro-organisms of the Substituted Amides of 2,4-D," by J. M. F. Leaper; "Experience from the Use of Dinitrobutylphenol as a weed killer under Swedish Conditions," by Birger Granstrom and Lennart Ottosson; "Some Problems of Weed Control," by A. S. Crafts; and Swedish Results with IPC and TCA as Weed Killers," by Mr. Aberg.

With C. J. Krister presiding, the final session of the Pesticides Section will be held Thursday afternoon. Six papers dealing with physical and analytical methods will be heard in this session.★★

#### FUNGICIDES

(Continued from Page 49)

was noted, however, that fruit treated with a preparation containing  $\frac{1}{4}$

percent of the glyoxalidine formulation known as 341C changed from a green to a yellow color, became soft, and, judging from taste, were fully ripe within four or five days. Inasmuch as the 341C formulation contained 32.8 percent isopropanol in addition to the glyoxalidine, it was desirable to determine whether one or both constituents were responsible for the observed effect. Consequently, in further trials, prepa-

arations of  $\frac{1}{4}$  and  $\frac{1}{8}$  percent 341C were compared with a preparation containing 1/12 percent isopropanol. After being treated, the fruit were placed in open wooden boxes and stored at 70°F. A Magness-Taylor pressure-tester (with pear head) was used to determine ripeness of representative samples of the fruit at daily intervals. No difference in rate of ripening was found in one lot of Hardy pears which proved to be par-

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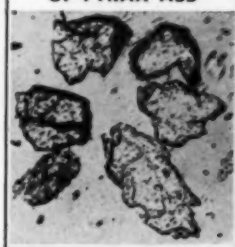
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tially ripe when treated. With Bartlett pears, however, the following were average pressures for six successive days after treatment.

Judging from these results, isopropanol was the constituent of 341C responsible for the increase in the rate of ripening.

Table I

	Days after treatment					
	1	2	3	4	5	6
Control	13.9	11.15	7.00	4.43	3.01	1.94
1/4 percent 341C	13.8	10.80	5.35	3.50	2.23	1.83
1/8 percent 341C	15.3	11.05	6.35	2.83	2.51	1.83
1/12 percent isopropanol	13.8	8.30	6.50	3.07	2.17	1.38

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## STATUTES

(Continued from page 40)

strict its incidence in the food stream sending more comprehensive information. In no case at this stage is there room for the 100-fold margin of safety generally considered to be the desirable objective.

Until a chemical is admitted to commerce and has found its place among pesticides, the extent of its usefulness will not be known. Nor will the extent of its incidence in consumer food be known until the product has been in commerce for a considerable time. A final determination of the "safety" of a chemical cannot be made until this experience is gained. Furthermore, any greater burden would be an unjustifiable waste of effort. Of the great number of chemicals on which scientific development is undertaken, only a small percentage reach the field. Of those that do, only a few become established. Most fail because of environmental conditions and misuse by average farmers.

### Don't Deprive Agriculture

**P**ESTICIDES currently in use should be exempted from amendatory provisions. Otherwise agriculture will be deprived of necessary and useful chemicals for an indefinite period. There are more than twenty thousand pesticides now registered with the Department of Agriculture. They include less than two hundred basic chemicals. The chronic poisoning properties of many of these are unknown. Some are under serious suspicion. Their continued use involves the same calculated risk that is inherent in the admission to commerce of a new pesticide on incomplete data. The risk is not alarming if we remember that the task is not yet complete. It should be remembered that we are dealing with the possibility of slow accumulations in the body of minute quantities of poison. Where this occurs at dangerous levels, the use of the accumulating poison should be stopped or curtailed. If this is done the risk involved is substantially nullified.

AGRICULTURAL CHEMICALS

### Collective Effort Called For

THE question remains as to where the necessary additional information is to come from. To be consistent with the philosophy of the new-drug section of the Act, the burden would have to be on the industry supported by the sale of the pesticide. Yet profit remains the major incentive to industry. It would be difficult to impose this burden effectively if it is true that pesticides must be allowed in commerce before the accumulation of the necessary data is complete. Even if the entire burden could be imposed on industry it does not appear that the interest of consumers could best be effectuated in that manner.

The pesticide industry is geared for controlling our natural enemies. Pesticidal residues do not result because that industry has shirked a responsibility. The hazard is a condition of the world in which we live. Any effort expended in the reduction of this hazard will reflect itself in the cost of a meal. The collective interest calls for collective effort. This can best be carried out by establishing adequate facilities within an appropriate public agency. The progressive development of toxicological information on the basic pesticidal chemicals would thereby be insured and the cost minimized.

The Bureau of Entomology and Plant Quarantine, at public expense, is vigorously engaged, along with state agencies and industry, in the endeavor to discover new and effective chemicals for use in the fight against the insects and other pests. It is fitting and proper that the Food and Drug Administration, another public agency, enter the ranks of this same force. It can do so in a most appropriate manner—by following through on a pesticide after its use has been instigated. Congress will have to provide funds for the appropriate expansion of this excellent agency.

Finally, the amendatory provisions should provide for the cancellation of registrations. Should positive evidence of danger from chronic poisoning appear, the offending

chemicals could then be outlawed from commerce or restricted in use. The evidence would also be available for the establishment of tolerances.

### Calls for Wisdom

DECISION on the application for, and the cancellation of, the registration of a pesticide must necessarily be made by the Administrator. Several recommendations have been made respecting an advisory council to help in these decisions.<sup>14</sup>

These recommendations should be exploited, with the agricultural interests being given substantial representation. While the basic problem is one of public health, it is also one of agriculture.

Both factors are inescapably and inseparably involved in the determination of the point where the harmful qualities of a pesticide outweigh its beneficial qualities. The decisions will call for the progressive

14. Footnote 3, at pp. 342, 425, 662, 754, 758.

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**SHIPPING REGULATIONS:** None

**RAILROAD CLASSIFICATION:** Insecticides, agricultural

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Drums, fibre ..... Lbs. Gross 51  
135 143

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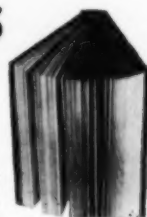
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## FERTILIZER MEET

(Continued from page 45)

crop by addition of needed plant food materials.

In opening the meeting, F. E. Price, dean and director of agriculture at Oregon State College, said our national population increase is startling when you consider that it is going up at the rate of one and one-half percent a year. Various estimates, he continued, set our national population figure at 190,000,000 by 1975. To meet the food needs of the steadily growing population, he warned, "We must not only conserve our soil, but we must make what we have better to make it more productive."

G. A. Fitzpatrick, Portland, president of the Northwest Plant Food Association, said northwest farmers invested \$20,000,000 in fertilizers in 1950. He expressed a hope that the land-grant colleges would expand their fertilizer trial programs.

The plant food association's soil improvement committee headed by George Wickstrom, Sumner, Washington, had charge of the meeting. Program chairman was Dr. R. A. Pendleton, Oregon State College. His committee included K. R. Baur, Portland, Dr. B. R. Bertramson, Washington State College department of agronomy chairman; and L. E. Warner, Oregon State College extension soil conservation specialist.

Before adjournment, Mr. Fitzpatrick announced that a summer meeting would be held in 1952 at Pocatello, Idaho. The soil improvement committee will again be in charge. The association's annual meeting will be held during October and the site will probably be Portland, Oregon.

Industry speakers at the Corvallis meeting included J. M. Tollefson, director of Swift and Company's Growers Advisory Service, Los An-

geles. He said from 10,000 random analyses reviewed for their untrient levels, 25 percent of the samples tested were low in nitrates, while 33 percent could be classified as medium in their concentrations. The remainder were adequate so far as nitrate levels are concerned.

The story of available phosphorus was much different. About 80 percent of the samples tested were low. In potassium, only 15 percent were classed as deficient.

## Supplies A Problem

A FAIRLY dark fertilizer outlook picture was painted by Roland Crumpler, Washington, D. C. Production and Marketing Administration spokesman. Compared with last year, he said, best estimates look for a 22 percent increase in nitrogen supplies; a 24 percent boost in potash carriers. Mr. Crumpler took a dim view of the phosphate outlook, saying that the national supply would



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be about the same as it was a year ago. With increased fertilizer usage, he implied, phosphate fertilizers would be more difficult to buy. Nitrogen and phosphate are the two most widely used materials in the Pacific northwest.

The PMA official told those attending the conference that the U. S. Department of Agriculture is sponsoring a program for production of nitrogen and phosphate fertilizers using a process which requires no sulfuric acid. Sulfur is the bottleneck in the phosphate production picture.

Steps are being taken Mr. Crumpler indicated, to conserve the material. Among conservation measures which can be taken immediately are: substitution of synthetic miticides for dusting sulfur, and substitution of alternative materials such as gypsum or low-grade sulfur for the refined product in such things as soil amendments.

Dr. B. R. Bertramson, chairman of the Washington State College agronomy department, discussed soil acidity. He pointed out that calcium is always present in quantity in a soil which has a normal pH. When it is decidedly acid or alkaline, the amount of calcium present is either reduced materially or it may be absent entirely.

Farmers will not get maximum efficiency from their soils or fertilizers until they pay more attention to soil acidity, Dr. Bertramson stressed. He was speaking particularly of farmers living in the high rainfall areas of western Oregon and Washington where soils tend toward acidity. Fortunately, however, he continued, soil tests are extremely accurate in determining how much lime to use to counteract acidity.

In discussing minor elements, Dr. A. W. Marsh of Oregon State college said, "They are frequently thought to be the magic elements which can solve problems which cannot be solved by using the primary elements, nitrogen, phosphorus, potash and calcium."

He indicated that boron and sulfur deficiencies are fairly wide-

spread in the northwest, especially on lighter soils. He warned against use of "shotgun" applications containing several minor elements. The practice could lead to toxicity, he emphasized.

Increased use of nitrogen fertilizers throughout the dryland Columbia basin wheat growing area was discussed by M. M. Oveson, superintendent of the Oregon State College Pendleton branch experiment station. "Only five years ago", Ove-

son said, "there was very little mention of nitrogen fertilizer in wheat production. Today it is the hottest subject among the farm people who are producing wheat. Many farmers, even in the areas of low rainfall, are consistently applying nitrogen fertilizers with marked increase in yields."

At the Pendleton station, application of 30 pounds of available nitrogen at seeding time have paid off in increased yields in trials which

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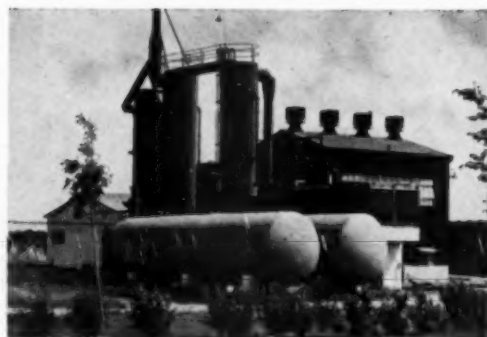
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have been carried out over the past seven years. The increase has averaged 7.4 bushels, Oveson said.

Out of area visitors who attended the meeting included J. M. Quinn, Los Angeles, president of the California Fertilizer association; and M. H. McVickar, Washington, D. C., National Fertilizer Association agronomist.

## CORN AND FERTILIZER

(Continued from page 44)

to total envisioned investment is cited for each yield level of each case with an assumed price of \$1.75 per bushel. In this case it may be seen that at current average yields the odds are 23. In other words the potential income is 23 times as great as the cost of operating supplies. With increasing fertilization the odds continuously decline to slightly over 5 at the optimum yield of 80 bushels. In attempting to persuade the farmer who envisions cost as operating supplies to increase fertilization, we are in effect asking him to voluntarily reduce his odds. This is not a tenable position for a salesman!

In the second instance, however, odds continuously improve to a yield of 68 bushels. Moreover, it is significant to note that profits per acre continue to increase to the optimum yield of 80 bushels at which point the enterpriser's odds are still better than at the average yield of 45 bushels. Selling here would seem to be a matter of asking for the order.

In short, it is only when hidden costs are seen and distributive costs allocated that it may be realized that the maximum risk is undertaken when the decision to raise a crop is made and the whole function of fertilizer is subsequently to minimize that risk by lengthening the odds. It is not proposed that elaborate bookkeeping systems be installed, but an understanding of cost elements and their magnitude is prerequisite to a full appreciation of optimum fertilizer use. Fortunately, the transition of the American far-

mer from a general handy man to a specialist employing other specialists increasingly involving cash transactions, his increasing need for capital for mechanization, and not least the influence of present taxes are factors which are making him increasingly cost conscious.★

## DORMANT SPRAY

(Continued from page 36)

particular season has been "pinpointed" as the best time to spray. This particular point is now under investigation.

### Precautions

**D**ORMANT spraying offers a greater safety factor than foliage treatment as far as sensitive annual crops are concerned simply because the crops are not present during the winter. However, this concentrated spray which is designed to kill woody plants can injure perennial plants off the right-of-way if the spray is allowed to come in contact with them, either by direct application or by drift. Every precaution should be observed to prevent drift from contacting desirable plants.

### What to Expect

**S**MALL brush, particularly that which is given overall coverage, may not produce leaves in the spring and may be completely dead by mid-summer. Tall brush and trees generally respond more slowly. These plants frequently leaf out, but gradually begin to die a few weeks after growth is resumed in the spring. Many tall trees have been noted to retain normal leaves and make growth for a short period even though the bark was loosened at the base of the tree and the sapwood well disintegrated. The normal splitting of the bark and general proliferation of tissue usually associated with foliage treatments does not always develop in dormant treatments of sprouts unless death is delayed for a long enough period in the summer to permit some growth. It does,

however, occur in trees which die more slowly.

This treatment has given very effective control on most species tested and it may reasonably be expected to be as effective as foliage applications. It has, in fact, proved to be more effective on some resistant species. Maples including red maple, in particular are quite susceptible to basal sprays and usually die quickly in the spring.

### Advantages Named

**W**HILE dormant brush control does not promise to become a general replacement for foliage application, it has some definite advantages and specific uses which may be summarized as follows:

1. It provides a safe means of controlling brush in areas where the proximity of annual crops sensitive to 2,4-D and 2,4,5-T makes foliage spraying hazardous.
2. It is an effective method of maintaining right-of-way previously treated with foliage applications which have reduced the stand. Here spot spraying of seedlings, and resistant species can be carried out as part of a maintenance program.
3. Highway departments, farmers and other groups will find dormant spraying a convenient means of utilizing "off season" labor for time when the pressure of other work is not so heavy.

4. For custom sprayers, dormant spraying makes it possible to retain personnel trained in chemical brush control who would otherwise have to be released or transferred at the end of the summer.

5. Areas such as swamps and right-of-way surrounded by crops which may be inaccessible during the summer, can be readily sprayed during the winter.

### Townsend Issues Booklet

Dr. G. R. Townsend, Belle Glade, Fla., has issued a seven page booklet describing services offered by his firm. The booklet also discusses advantages of field testing.



## Classified Advertising

Rules for classified advertisements are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

### Positions Open:

**Plant Pathologist:** Established manufacturer of agricultural chemicals (Eastern location) has opportunity in development of new agricultural fungicides, involving laboratory and testing, requiring thorough knowledge and experience in such techniques. Applicant (age 30-40 preferred) should supply full particulars on education, experience, previous employment, the usual personal information, and salary desired. Write Box 473, 221 W. 41st Street, N. Y.

**Wanted.** A sound proposition for the development or expansion of an Agricultural Chemical business. Available cash \$50,000. Resources \$250,000. Experienced manufacturing executive. Address Box No. 554, c/o Agricultural Chemicals.

**Entomologist** to take charge of investigations in the control of cotton bollworms in Africa required. Excellent opportunity for entomologist with experience of cotton pests. Salary \$4,500 to \$5,500 free of tax. Free housing and passages for entomologist and wife. Three months' leave per annum in Europe or South Africa. Two years' contract in the first place. Write stating age and full particulars of qualifications and experience to Personnel Manager, Pest Control Ltd., Bourn, Cambridge, England.

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**Sales Representative** — Desires new position with manufacturer of agricultural chemicals. At present employed. Has covered East Central

states and knows the formulators and others in trade well. Five years in present sales job with manufacturer of basic fungicide and insecticide materials. Graduate chemist. Married. Prefer eastern location but will go anywhere. For further details, write Box No. 552, % Agricultural Chemicals.

**Sales Representative:** Man age 36 married, no children, wants sales staff job with agricultural chemicals company. 5½ years with last employer. Past experience includes two years as administrative assistant to General Manager handling public and industrial relations and 3 years as chemical sales representative. Selling emphasis placed on herbicides (plant hormones and oxidizing) for pre-emergence and contact control, but also sold organic and inorganic insecticides and fungicides and fertilizers. Will travel and will accept either foreign or domestic location. Address Box No. 553, c/o Agricultural Chemicals.

**Branch Manager:** responsible, young Ohio man, with successful sales record in garden and insecticide industry desires connection in sales or management. Formerly, associated with Standard Oil subsidiary marketing small-package chemicals to hardware, nursery, & department stores. Experience in assisting jobber salesmen with merchandising suggestions; training new personnel; addressing dealer groups; and selling both newspaper ads and radio time to retailers. Clean record; eligible for immediate rehire. Address Box No. 555, % Agricultural Chemicals.

### Opens New K.C. Office

The Pennsylvania Salt Manufacturing Company has opened a new district sales office in Kansas City. This will be Pennsalt's central sales and service headquarters for Kansas, Missouri, Iowa and Nebraska. Heading this organization will be Cecil B. Roberts as district sales manager. A representative will be at this office to handle bulk agricultural chemicals. For the time being, however, distribution of bulk heavy materials and industrial chemicals in this territory will continue to be through existing district offices.

Mr. Roberts joined Pennsalt in 1941 as a salesman.

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### N. Y. Fertilizer Mgr. Dies

Eugene R. Martino, 59, founder and head of Eugene Martino & Son, Inc., manufacturers and distributors of fertilizer, Hicksville, L. I., New York, died July 16. He founded the firm in 1938 and his son, Louis, is expected to carry on the business.

### Laake to Costa Rican Job

Dr. Ernest W. Laake, U. S. Department of Agriculture, has been appointed to assist the Costa Rican Government in the development and utilization of methods to control livestock parasites under the Point Four program, it has been announced.

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(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission.)

## New Weed Control Film

Region 3 of the Bureau of Reclamation has released a 16 mm color-sound motion picture on modern methods of chemically controlling weeds in irrigated areas. Entitled "Controlling Weeds on Irrigation Systems", the film was produced primarily for the benefit of operating personnel, irrigation superintendents and managers, maintenance crews and others. Running about 30 minutes, the film shows problems that weeds can cause on the ditch banks and in channels and drains, and shows the need for controlling these weeds.

## Bemis Shifts Five

Bemis Bros. Bag Co. St. Louis, has announced several management and sales appointments.

P. J. Hewitt, formerly sales manager of the Peoria multiwall plant, has been promoted to assistant manager. He began his career with Bemis in 1916. W. F. Mulvaney succeeds Mr. Hewitt as sales manager after serving as assistant sales manager since last year. He joined the company in 1939.

H. O. Parrant, formerly in charge of the Bemis sales office at Phoenix, has been appointed sales manager at Los Angeles. He became a member of the company's sales force at Kansas City in 1926. His successor as the firm's representative in Phoenix is L. P. Sempek. At the Memphis plant, the new sales manager is S. T. Newton.

## Kerrigan Honorary L.L.D.

James J. Kerrigan, president of Merck & Co., Rahway, N. J., was the recipient of an honorary degree of doctor of laws from National University of Ireland conferred July 12. The degree was awarded at a special ceremony at the university in Dublin, Ireland, and was attended by Mrs. Kerrigan and their children. Mr. Kerrigan has been associated with Merck for the past 44 years, becoming president several years ago, during which time the company became one of the world's leading producers of chemicals.

## Tale Ends...

**W**HAT'S in a name? We recently learned the name of an insecticide firm at Long Beach, Calif., the "Drop Dead Co." This brings up the possibility of numerous interesting situations, such as the would-be customer who might telephone the office only to be greeted with, "Good morning . . . Drop Dead" . . . or, should an employee of the company make application for

a loan, he might say to the banker, "Drop Dead," upon being asked about his job. Most bankers wouldn't like the inference. But at least the name is unique, and the company's title should certainly be remembered by anyone who hears or reads it.

To guard against "warm-water cycles," the *Compania Administradora del Guano*, semi-official

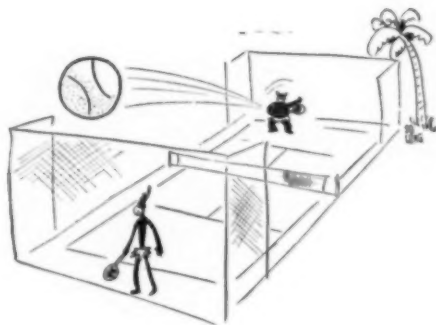
agency for developing deposits of guano in Peru, has affected a mass migration of some 20 million guano birds to safer quarters by a series of "artificial islands" made by erecting walls across promontories. An article in *Time*, July 9, describes the reasons for this action.

Off the coast of Peru, cold water wells up from the sea bottom, bringing with it nutrients to support millions of fish on which the guano birds feed. When for any reason, such as a shift of wind or ocean currents, warm water comes to the area, the fish disappear and the birds starve. Such cycles occurred in 1891 and again in 1925 with disastrous effects. This year such an occurrence threatened again, with the sea growing warm and fish becoming scarce. But instead of migrating to southern Peru where they would fall prey to many natural enemies (as they did in past cycles), the birds found sanctuary in the "islands" which the company had prepared. Here the birds can roost, safe from land enemies, and with the cold sea surrounding them full of fish.

The extent to which the country has tried to develop its guano business is indicated by the fact that armed guards patrol the small islands where the birds live. Human egg-robbers are thus discouraged, as are the guano bird's natural enemies such as cormorants and vultures. The company has erected walls at the top of cliffs so that the birds must take off at a sharp angle rather than a sloping, foot-dragging ascent which would probably brush guano into the sea. The law prevents ships from blowing whistles in the area, since such a noise would startle the birds, send them into the air in an excited mass, and thus waste their droppings in the sea.

That such careful treatment has paid off is seen in the production figures. In 1909, the year the company was formed to develop guano deposits, the crop was only 77,000 tons. Last year it amounted to 240,800 tons (nearly \$15 million).

**AGRICULTURAL CHEMICALS**



## Out,-and how!

**W**ILD tennis shots, like misdirected advertising, usually end up "out", in sharp contrast to advertising directed to specific markets to be sold. For example, if you would sell and keep selling in the field of chemicals for agricultural use—as well as allied products useful to this market, you will get no "outs" by advertising regularly in

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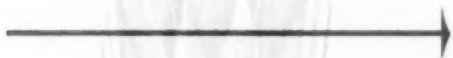
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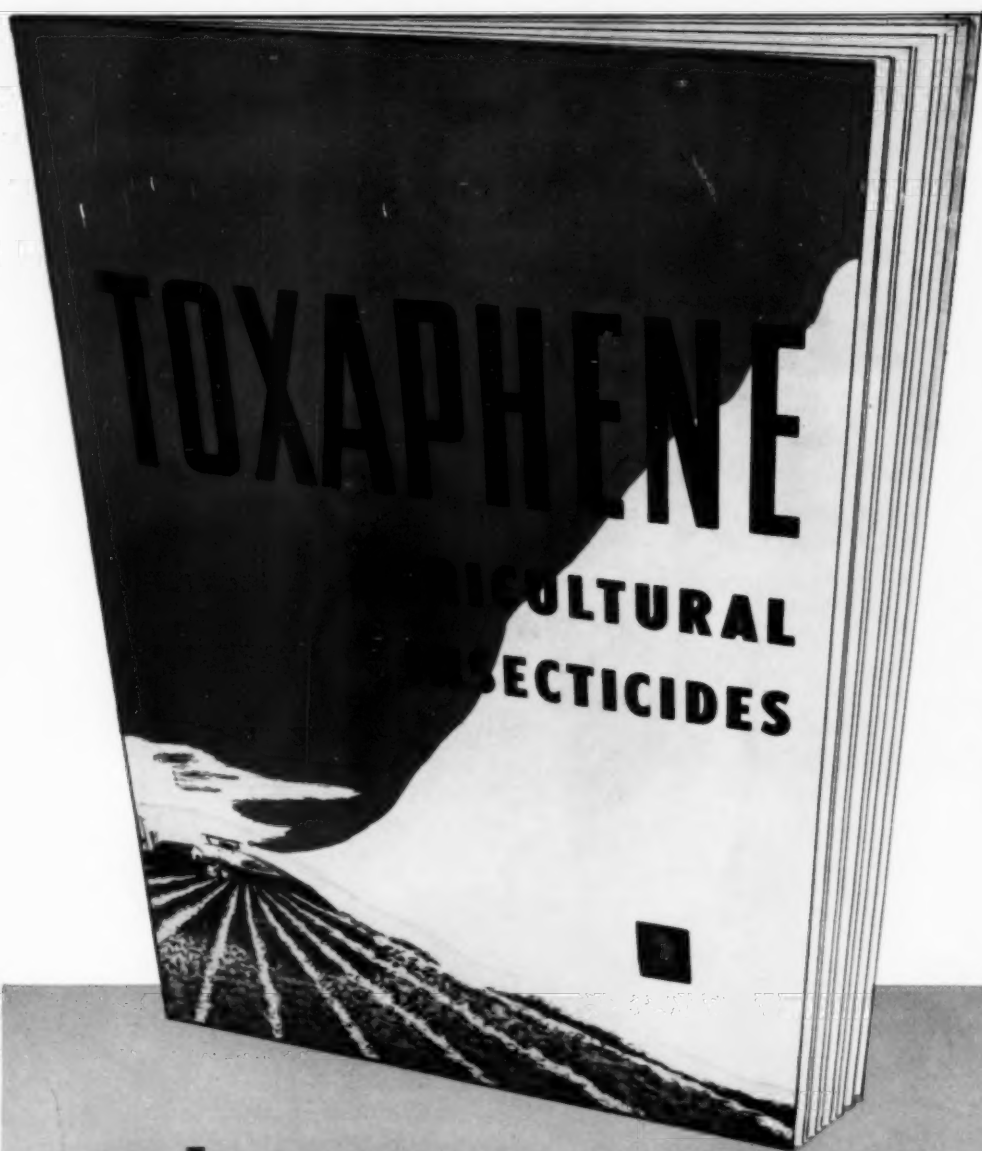
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